

## Project name

**WCR B2-A-Commercial (Be Lean)**

As designed

Date: Wed May 29 09:32:25 2019

## Administrative information

## Building Details

Address: Address 1, City, Postcode

## Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.11

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.11

BRUKL compliance check version: v5.6.a.1

## Owner Details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

## Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Criterion 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 | 37.5                |
| Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum               | 37.5                |
| Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum             | 33.5                |
| 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                  | 0.15                 | 0.15                 | G0000006:Surf[2]                         |
| Floor   | 0.25                  | 0.13                 | 0.13                 | G0000006:Surf[0]                         |
| Roof  | 0.25                  | 0.13                 | 0.13                 | G0000006:Surf[1]                         |
| Windows***, roof windows, and rooflights  | 2.2                   | 1.4                  | 1.4                  | G000000A:Surf[3]                         |
| Personnel doors   | 2.2                   | -                    | -                    | No Personnel doors in building           |
| Vehicle access & similar large doors  | 1.5                   | -                    | -                    | No Vehicle access doors in building      |
| High usage entrance doors   | 3.5                   | -                    | -                    | No High usage entrance doors in building |
| 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.  |                       |                      |                      |  |
| ** 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 <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa | 10                        | 3             |

## 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.

|   |      |
|---|------|
| <b>Whole building lighting automatic monitoring &amp; targeting with alarms for out-of-range values</b> | YES  |
| <b>Whole building electric power factor achieved by power factor correction</b>                         | <0.9 |

### 1- VRF Swimming Pool

|   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>  | 0.91               | 5                  | 0                  | 0             | 0.7           |
| <b>Standard value</b>   | 0.91*              | 3.2                | N/A                | N/A           | 0.5           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>  |                    |                    |                    |               | 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. |                    |                    |                    |               |               |

### 2- VRF Swimming Pool Office

|   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>  | 0.91               | 5                  | 0                  | 0             | 0.7           |
| <b>Standard value</b>   | 0.91*              | 3.2                | N/A                | N/A           | 0.5           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>  |                    |                    |                    |               | 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. |                    |                    |                    |               |               |

### 3- VRF Office Ground Floor

|   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>  | 0.91               | 5                  | 0                  | 0             | 0.7           |
| <b>Standard value</b>   | 0.91*              | 3.2                | N/A                | N/A           | 0.5           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>  |                    |                    |                    |               | 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. |                    |                    |                    |               |               |

### 4- VRF Restaurant

|   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>  | 0.91               | 5                  | 0                  | 0             | 0.7           |
| <b>Standard value</b>   | 0.91*              | 3.2                | N/A                | N/A           | 0.5           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>  |                    |                    |                    |               | 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. |                    |                    |                    |               |               |

### 5- VRF Cafe

|   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>  | 0.91               | 5                  | 0                  | 0             | 0.7           |
| <b>Standard value</b>   | 0.91*              | 3.2                | N/A                | N/A           | 0.5           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>  |                    |                    |                    |               | 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. |                    |                    |                    |               |               |

### 6- VRF Kitchen

|   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>  | 0.91               | 5                  | 0                  | 0             | 0.7           |
| <b>Standard value</b>   | 0.91*              | 3.2                | N/A                | N/A           | 0.5           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>  |                    |                    |                    |               | 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. |                    |                    |                    |               |               |

7- VRF Office 1st Floor

|   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>  | 0.91               | 5                  | 0                  | 0             | 0.7           |
| <b>Standard value</b>   | 0.91*              | 3.2                | N/A                | N/A           | 0.5           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>  |                    |                    |                    |               | 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. |                    |                    |                    |               |               |

8- VRF Gym

|   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>  | 0.91               | 5                  | 0                  | 0             | 0.7           |
| <b>Standard value</b>   | 0.91*              | 3.2                | N/A                | N/A           | 0.5           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>  |                    |                    |                    |               | 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. |                    |                    |                    |               |               |

9- VRF Gym Studio

|   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>  | 0.91               | 5                  | 0                  | 0             | 0.7           |
| <b>Standard value</b>   | 0.91*              | 3.2                | N/A                | N/A           | 0.5           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>  |                    |                    |                    |               | 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. |                    |                    |                    |               |               |

10- VRF Gym Office

|   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>  | 0.91               | 5                  | 0                  | 0             | 0.7           |
| <b>Standard value</b>   | 0.91*              | 3.2                | N/A                | N/A           | 0.5           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>  |                    |                    |                    |               | 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. |                    |                    |                    |               |               |

11- VRF Gym Training Room

|   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>  | 0.91               | 5                  | 0                  | 0             | 0.7           |
| <b>Standard value</b>   | 0.91*              | 3.2                | N/A                | N/A           | 0.5           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>  |                    |                    |                    |               | 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. |                    |                    |                    |               |               |

1- DHW Swimming Pool

|   | Water heating efficiency | Storage loss factor [kWh/litre per day] |
|---|--------------------------|---|
| <b>This building</b>  | 0.9                      | 0.005                                   |
| <b>Standard value</b>   | 0.9*                     | N/A                                     |
| * Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73. |                          |   |

2- DHW

|   | Water heating efficiency | Storage loss factor [kWh/litre per day] |
|---|--------------------------|---|
| <b>This building</b>  | 0.9                      | 0.005                                   |
| <b>Standard value</b>   | 0.9*                     | N/A                                     |
| * Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73. |                          |   |

### 3- DHW Gym

|                       |                                 |  |
|-----------------------|---------------------------------|--|
|                       | <b>Water heating efficiency</b> | <b>Storage loss factor [kWh/litre per day]</b> |
| <b>This building</b>  | 0.9                             | 0.005  |
| <b>Standard value</b> | 0.9*                            | N/A  |

\* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.

### 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      |  |
|                   | 0.3                   | 1.1 | 0.5 | 1.9 | 1.6 | 0.5 | 1.1 | 0.5 | 1 |      |               |  |
|                   | <b>Standard value</b> |     |     |     |     |     |     |     |   |      |               |  |
| G0B Swimming Pool | -                     | -   | -   | 1.6 | -   | -   | -   | -   | - | -    | N/A           |  |
| G0B Office        | -                     | -   | -   | 1.6 | -   | -   | -   | -   | - | -    | N/A           |  |
| G0 B2 Office      | -                     | -   | -   | 1.6 | -   | -   | -   | -   | - | -    | N/A           |  |
| G0 B2 Restaurant  | -                     | -   | -   | 1.6 | -   | -   | -   | -   | - | -    | N/A           |  |
| G0 B2 Cafe        | -                     | -   | -   | 1.6 | -   | -   | -   | -   | - | -    | N/A           |  |
| G0 B2 Kitchen     | -                     | -   | -   | 1.6 | -   | -   | -   | -   | - | -    | N/A           |  |
| G1 B2 Offices     | -                     | -   | -   | 1.6 | -   | -   | -   | -   | - | -    | N/A           |  |
| G1 B2 Gym         | -                     | -   | -   | 1.6 | -   | -   | -   | -   | - | -    | N/A           |  |
| G1 B2 Studio      | -                     | -   | -   | 1.6 | -   | -   | -   | -   | - | -    | N/A           |  |
| G1 B2 Office      | -                     | -   | -   | 1.6 | -   | -   | -   | -   | - | -    | N/A           |  |
| G1 B2 Training    | -                     | -   | -   | 1.6 | -   | -   | -   | -   | - | -    | N/A           |  |

### General lighting and display lighting

| Zone name         | Luminous efficacy [lm/W] |      |              | General lighting [W] |
|-------------------|--------------------------|------|--------------|----------------------|
|                   | Luminaire                | Lamp | Display lamp |                      |
|                   | 60                       | 60   | 22           |                      |
|                   | <b>Standard value</b>    |      |              |                      |
| G0B Swimming Pool | -                        | 120  | -            | 1470                 |
| G0B Showers       | -                        | 120  | -            | 75                   |
| G0B Circulation   | -                        | 120  | -            | 74                   |
| G0B Changing      | -                        | 120  | -            | 186                  |
| G0B BOH           | 120                      | -    | -            | 38                   |
| G0B Circulation   | -                        | 120  | -            | 118                  |
| G0B Office        | 120                      | -    | -            | 209                  |
| G0B Circulation   | -                        | 120  | -            | 101                  |
| G0B BOH           | 120                      | -    | -            | 30                   |
| G0 B2 Office      | 120                      | -    | -            | 2738                 |
| G0 B2 Restaurant  | -                        | 120  | 120          | 270                  |

| General lighting and display lighting |                | Luminous efficacy [lm/W] |      |              | General lighting [W] |
|---------------------------------------|----------------|--------------------------|------|--------------|----------------------|
| Zone name                             | Standard value | Luminaire                | Lamp | Display lamp |                      |
|                                       |                | 60                       | 60   | 22           |                      |
| G0 B2 Circulation                     |                | -                        | 120  | -            | 230                  |
| G0 B2 Circulation                     |                | -                        | 120  | -            | 44                   |
| G0 B2-A WC                            |                | -                        | 120  | -            | 136                  |
| G0 B2 BOH                             |                | 120                      | -    | -            | 25                   |
| G0 B2 WC                              |                | -                        | 120  | -            | 49                   |
| G0 B2 Cafe                            |                | -                        | 120  | 120          | 200                  |
| G0 B2 Kitchen                         |                | -                        | 120  | -            | 329                  |
| G0 B2 Circulation                     |                | -                        | 120  | -            | 34                   |
| G0 B2 BOH                             |                | 120                      | -    | -            | 23                   |
| G1 B2 Circulation                     |                | -                        | 120  | -            | 48                   |
| G1 B2 Circulation                     |                | -                        | 120  | -            | 56                   |
| G1 B2 Offices                         |                | 120                      | -    | -            | 3953                 |
| G1 B2 Gym                             |                | -                        | 120  | -            | 192                  |
| G1 B2 Studio                          |                | -                        | 120  | -            | 177                  |
| G1 B2 Office                          |                | 120                      | -    | -            | 107                  |
| G1 B2 Training                        |                | 120                      | -    | -            | 313                  |
| G1 B2 Changing                        |                | -                        | 120  | -            | 43                   |
| G1 B2 WC                              |                | -                        | 120  | -            | 50                   |
| G1 B2 Changing                        |                | -                        | 120  | -            | 44                   |
| G1 B2 WC                              |                | -                        | 120  | -            | 77                   |

**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? |
|-------------------|--------------------------------|-----------------------|
| G0B Swimming Pool | N/A                            | N/A                   |
| G0B Office        | N/A                            | N/A                   |
| G0 B2 Office      | NO (-13.3%)                    | NO                    |
| G0 B2 Restaurant  | NO (-56.9%)                    | YES                   |
| G0 B2 Cafe        | NO (-28.2%)                    | NO                    |
| G0 B2 Kitchen     | N/A                            | N/A                   |
| G1 B2 Offices     | NO (-17.5%)                    | NO                    |
| G1 B2 Gym         | N/A                            | N/A                   |
| G1 B2 Studio      | N/A                            | N/A                   |
| G1 B2 Office      | N/A                            | N/A                   |
| G1 B2 Training    | 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

|   |     |
|---|-----|
| <b>Were alternative energy systems considered and analysed as part of the design process?</b> | 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 |
|---|---------|----------|
| Area [m <sup>2</sup> ]                                | 2918.8  | 2918.8   |
| External area [m <sup>2</sup> ]                       | 5124.2  | 5124.2   |
| Weather   | LON     | LON      |
| Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa] | 3       | 3        |
| Average conductance [W/K]                             | 1438.41 | 1920.33  |
| Average U-value [W/m <sup>2</sup> K]                  | 0.28    | 0.37     |
| Alpha value* [%]                                      | 10.06   | 10       |

\* 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                   |
| <b>9</b>  | <b>A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways</b>      |
| <b>55</b> | <b>B1 Offices and Workshop businesses</b>                          |
|           | 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           |
| <b>36</b> | <b>D2 General Assembly and Leisure, Night Clubs, and Theatres</b>  |
|           | 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        | 29.81         | 35.1          |
| Cooling        | 5.37          | 5.61          |
| Auxiliary      | 8.25          | 4.07          |
| Lighting       | 9.24          | 21.22         |
| Hot water      | 70.51         | 66.29         |
| Equipment*     | 40.46         | 40.46         |
| <b>TOTAL**</b> | <b>123.18</b> | <b>132.29</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> ] | 167.97 | 185.48   |
| Primary energy* [kWh/m <sup>2</sup> ]         | 192.57 | 216.19   |
| Total emissions [kg/m <sup>2</sup> ]          | 33.5   | 37.5     |

\* 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 |
|---|-------------------|-------------------|--------------------|--------------------|-------------------|---------------|---------------|------------------|------------------|
| <b>[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b> |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual  | 32.9              | 109.1             | 10.2               | 8.1                | 3.9               | 0.89          | 3.74          | 0.91             | 5                |
| Notional  | 0                 | 0                 | 0                  | 0                  | 0                 | 0             | 0             | ----             | ----             |
| <b>[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b> |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual  | 34.2              | 110.3             | 10.7               | 8.2                | 3.9               | 0.89          | 3.74          | 0.91             | 5                |
| Notional  | 34.3              | 84.1              | 11.1               | 6.2                | 2.1               | 0.86          | 3.79          | ----             | ----             |
| <b>[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b> |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual  | 521.8             | 0                 | 162.4              | 0                  | 19.4              | 0.89          | 3.74          | 0.91             | 5                |
| Notional  | 36.5              | 97.5              | 11.8               | 7.1                | 2.1               | 0.86          | 3.79          | ----             | ----             |
| <b>[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b> |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual  | 12.5              | 32.9              | 3.9                | 2.4                | 47.2              | 0.89          | 3.74          | 0.91             | 5                |
| Notional  | 657.5             | 0                 | 211.9              | 0                  | 10.9              | 0.86          | 3.79          | ----             | ----             |
| <b>[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b> |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual  | 205.1             | 121.8             | 63.8               | 9.1                | 13.2              | 0.89          | 3.74          | 0.91             | 5                |
| Notional  | 29.1              | 73.5              | 9.4                | 5.4                | 16.5              | 0.86          | 3.79          | ----             | ----             |
| <b>[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b> |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual  | 0                 | 674.7             | 0                  | 50.2               | 20.1              | 0.89          | 3.74          | 0.91             | 5                |
| Notional  | 84.6              | 234.6             | 27.3               | 17.2               | 7                 | 0.86          | 3.79          | ----             | ----             |
| <b>[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b> |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual  | 79.4              | 126.3             | 24.7               | 9.4                | 20                | 0.89          | 3.74          | 0.91             | 5                |
| Notional  | 0                 | 781.6             | 0                  | 57.3               | 10.6              | 0.86          | 3.79          | ----             | ----             |
| <b>[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b> |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual  | 24.4              | 207.8             | 7.6                | 15.4               | 8.4               | 0.89          | 3.74          | 0.91             | 5                |
| Notional  | 52.3              | 210               | 16.8               | 15.4               | 7                 | 0.86          | 3.79          | ----             | ----             |
| <b>[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b> |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual  | 1.9               | 15.8              | 0.6                | 1.2                | 30.8              | 0.89          | 3.74          | 0.91             | 5                |
| Notional  | 25.2              | 286.7             | 8.1                | 21                 | 2.9               | 0.86          | 3.79          | ----             | ----             |
| <b>[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b> |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual  | 133.8             | 94.1              | 41.6               | 7                  | 8.4               | 0.89          | 3.74          | 0.91             | 5                |
| Notional  | 16.7              | 31.2              | 5.4                | 2.3                | 17.3              | 0.86          | 3.79          | ----             | ----             |
| <b>[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b> |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual  | 49.3              | 80.5              | 15.4               | 6                  | 8.4               | 0.89          | 3.74          | 0.91             | 5                |
| Notional  | 103.7             | 186.7             | 33.4               | 13.7               | 2.9               | 0.86          | 3.79          | ----             | ----             |
| <b>[ST] No Heating or Cooling</b>   |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual  | 0                 | 0                 | 0                  | 0                  | 0                 | 0             | 0             | 0                | 0                |
| Notional  | 44.8              | 136.8             | 14.4               | 10                 | 2.9               | 0.86          | 3.79          | ----             | ----             |

### 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               | 0.15  | G0000006:Surf[2]                         |
| Floor   | 0.2                | 0.13  | G0000006:Surf[0]                         |
| Roof  | 0.15               | 0.13  | G0000006:Surf[1]                         |
| Windows, roof windows, and rooflights   | 1.5                | 1.4   | G000000A:Surf[3]                         |
| Personnel doors   | 1.5                | -   | No Personnel doors in building           |
| 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 <sub>i-Typ</sub> = Typical individual element U-values [W/(m <sup>2</sup> K)] |                    | U <sub>i-Min</sub> = Minimum individual element U-values [W/(m <sup>2</sup> K)] |  |
| * There might be more than one surface where the minimum U-value occurs.        |                    |   |  |

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