PART L COMPLIANCE

&

BER ASSESSMENT

TEMPLAR PLACE SHD

BALBRIGGAN, CO. DUBLIN

Rev: 01

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PART L COMPLIANCE & BER ASSESSMENT

1. Executive Summary:

The purpose of this report is to outline the approach to achieving NZEB compliance and to demonstrate the proposed design for the Templar Place SHD in Balbriggan, Dublin complies with both TGD Part L: 2019 (dwellings) and TGD Part L: 2017 (buildings other than dwellings).

DEAP Version 4.2.0 in conjunction with the DEAP 4.2.1 Manual was used for the domestic calculations.

As well as achieving the minimum targets regarding U-Values, Heating System efficiency and Renewable Energy Technologies etc. as set out in this document, the building must demonstrate (in DEAP – Dwelling Energy Assessment Procedure) that the building has a Carbon Performance Coefficient (CPC) of < 0.35, an Energy Performance Coefficient (EPC) of <0.30 and a Renewable Energy Ratio (RER) of 0.20.

The Dwelling Energy Assessment Procedure (DEAP) is the official Irish methodology for calculating the energy performance and associated carbon dioxide emissions for the provision of space heating, ventilation, water heating and lighting in dwellings. DEAP consists of a software tool and an associated guidance manual is a key component of the Irish Building Energy Rating (BER) scheme. DEAP is also the compliance tool specified in Part L of the Irish Building Regulations.

IES VE Compliance using the SBEMie v5.5.h.1 methodology was used for the non-domestic NEAP calculations

SBEMie is the official Irish methodology for calculating the energy performance and associated carbon dioxide emissions for the provision of space heating, ventilation, water heating and lighting in buildings other than dwellings. The SBEMie software tool is a key component of the Irish Building Energy Rating (BER) scheme.

Results in Section 5 show the proposed development achieves compliance with both TGD Part L: 2019 and TGD Part L: 2017.

2. Introduction:

The overall energy efficiency objective for this project is to deliver a minimum A3 rated dwellings and landlord areas which comply with TGD Part L: 2019 & TGD Part L: 2017.

The apartment types listed in the results were chosen for the analysis in this report, as these are deemed to represent the worst case. It is predicted that achieving compliance for the selected apartments will result in all of the remaining apartments achieving compliance.

The approach to achieving NZEB compliance is to use the principles of integrated design to prioritise a well-designed dwelling envelope which responds to both climate and occupant needs. The extent and complexity of services required can be rationalised, thus reducing the associated energy and carbon implications along with capital and running costs.

The methodology to deliver NZEB compliance is summarised in the three step strategy below with further details in the following sections.

- First Step – Minimise Demand through Passive Measures.
- Second Step – Reduce Consumption
- Third Step – Use low-carbon fuel sources.

3. NZEB Methodology:

3.1 Passive Measures

This takes into consideration factors such as insulation levels, thermal bridging and air permeability. Factors to be considered include;

- Enhance insulation levels.
- Airtight building envelope.
- Minimise thermal bridging through careful detailing.

Building Fabric

In order to minimise the heating load of the development and provide improved comfort for the occupants the following construction fabric data is proposed:

Element	U-value (W/m^2.K)
Wall	0.15
Floor	0.14
Roof	0.12
Door	1.20

Table 1 – Thermal Properties of Dwelling Fabric

Glazing Description	U-value (W/m^2.K)	Frame Factor	g-value
External Glazing Vertical (Including Frame)	1.20	0.70	0.60

Table 2 – Glazing Properties

Air tightness

An air tight building envelope has two main advantages; it reduces infiltration of external cold air which increases the heating demand and related energy consumption. It also prevents the exfiltration of warm humid air into the building fabric which can lead to moisture build-up. Careful planning and coordination is required to ensure an airtight envelope is achieved. It is critical therefore to ensure the following;

- The continuous airtight envelope is clearly indicated on drawings.
- All mechanical and electrical services are carefully coordinated to minimise service penetrations though the envelope.
- All services and equipment are to be neatly installed and clearly marked.
- Clearly communicate this to contractors through drawings.
- Ensure that any unavoidable penetrations are correctly sealed using approved tapes and gaskets.

It is proposed to provide Demand Control Ventilation which achieves compliance with Part F of the Building Regulation 2013. The target air permeability rate is 3.0 m3/(h.m2).

Thermal Bridging

The reduction of linear thermal bridging is an important aspect of achieving NZEB along with eliminating the risk of condensation and mould growth. It is proposed that the dwelling details will conform to "Limiting Thermal Bridging and Air Infiltration – Acceptable Construction Details" (https://www.housing.gov.ie) as referenced in Building Regulations 2008, 2011 and 2019 TGD L.

3.2 Active Measures

Once energy demand is minimised through passive measures the full potential of efficient mechanical and electrical systems can be realised. These systems include:

- Efficient Heating, Ventilation and Hot Water systems.
- Variable speed energy efficient pumps and fans.
- Efficient lighting.

Heating Systems

It is proposed that low temperature hot water will be provided to radiators by an Exhaust Air Heat pump. The exhaust air heat pump will also contribute to the generation of domestic hot water with a contribution from immersion heaters. This solution offers instant and controllable space heating and hot water, it is also cost effective, clean, efficient and user-friendly.

The heating system will be split into two individually controlled zones space heating and a hot water heating circuit allowing separate and independent automatic time control of space heating and hot water cylinder in line with Section 1.4.3.1 of TGD Part L: 2019.

Heating within the landlord spaces will be provided by electric heaters.

Ventilation

It is proposed to use Whole-house extract ventilation. The target air permeability rate is 3.0 m3/(h.m2) and with this improved air tightness will reduce the heat losses over the heating period per calendar year in the dwelling.

Low Energy Lighting

The use of LED lighting throughout each apartment block will provide energy efficiency, reduced electrical costs, and also a long life so that replacement and maintenance costs are minimised.

Renewable Energy Technologies

An important factor in NZEB compliance is renewable energy. TGD Part L: 2019 & 2017 state:

"Providing that, the nearly zero or very low amount of energy required is covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby;"

Results in Section 5 demonstrate that all of the renewable requirement within the apartments can be provided by the exhaust air heat pump.

It is proposed that a solar PV array will be installed at roof level at a 15 degree pitch on each apartment block in order to achieve the required RER in the landlord areas.

The below table indicates number of PV panels per block. Each panel is 340W.

Block	No. PV Panels supplying Landlord Area
A	22
B	24
C	6

Table 3 – PV Renewable Requirement (Landlord Area)

4. Assessment Inputs:

Templar Place SHD Apartments - Inputs		Value
Ventilation	Intermittent fans/passive vents	1
	Ventilation method	EAHP
	Specific fan power [W/(l/s)]	0.64
	Exhaust Air flow Rate [m³/hr]	1
	Airtightness (Q50 as per EN13829)	3
Building Elements	External Wall U-Value (W/m²K)	0.15
	Door U-Value (W/m²K)	1.20
	Roof U-Value (W/m²K)	0.12
	Floor U-Value (W/m²K)	0.14
	Glazing U-Value (W/m²K)	1.20
	Glazing Solar Transmittance	0.60
	Glazing Frame Factor	0.70
	Thermal Bridging Factor (ACDs)	0.15
Water Heating	Distribution losses	Yes
	Storage losses	Yes
	Hot water storage volume (l)	180
	Temperature factor unadjusted	0.60
	Temperature factor multiplier	0.90
	Declared Loss Factor (kWh/day)	1.20
Lighting	% of low energy fixed lighting outlets	100
Internal Heat Capacity	Thermal mass category of dwelling	Medium
Distribution System Losses & Gains	Heating system control category	1
	Heating system responsiveness category	1
Pumps	Central heating pump qty.	1
	Pump electric consumption (kWh/yr)	52
	Heating system controlled by thermostat	Yes
Space Heating & Water Heating	Primary Space heating type	Exhaust Air Heat Pump
	Efficiency of space heating system (%)	556
	Efficiency of water heating system (%)	254
	Efficiency adjustment factor	1
	Design Flow Temperature of Heat Pump [ºC]	35
	Daily Operation Hours [h]	24
Fuel Data	Main space & water heating system	Electricity
Renewable & Energy Saving Technologies	Renewable system	Exhaust Air Heat Pump
	Renewables Primary Energy	5471

Table 4 – Inputs

5. Results:

The following results are achieved.

Results	Type 01 Studio	Type 02 1 Bed Apt	Type 01 2 Bed Apt	Type 02 3 Bed Apt
Energy Rating	A3	A3	A3	A2
Energy Value [kWh/m²/yr]	58.34	54.72	51.38	47.11
CO2 Emissions Indicator [kgCO2/m²/yr]	11.47	10.76	10.10	9.26
CPC	0.248	0.282	0.288	0.286
EPC	0.252	0.290	0.300	0.298
RER	0.48	0.50	0.52	0.50

Table 5 – DEAP Results

Results in table 5 demonstrate compliance with NZEB requirements stipulated within TGD Part L: 2019 when using parameters described within this report in regard to U-values, air tightness M&E services and renewable allowance.

Block	Energy Rating	Energy Value [kWh/m²/yr]	CO2 Emissions [kgCO2/m²/yr]	EPC	CPC	RER	TGD L 2017 Compliant
A	A3	43.21	8.48	1.00	1.03	0.20	Yes
B	A3	41.80	8.43	0.99	1.03	0.20	Yes
C	A3	42.10	8.02	0.99	1.01	0.20	Yes

Table 6 – NEAP Results – Landlord Areas

Results in table 6 demonstrate compliance with NZEB requirements stipulated within TGD Part L: 2017.

Note that the results in this report are directly affected by the inputs and any deviation from these will output different results.