Passive Dynamics
SUSTAINABILITY CONSULTANTS

IGBC MEMBER | 2022

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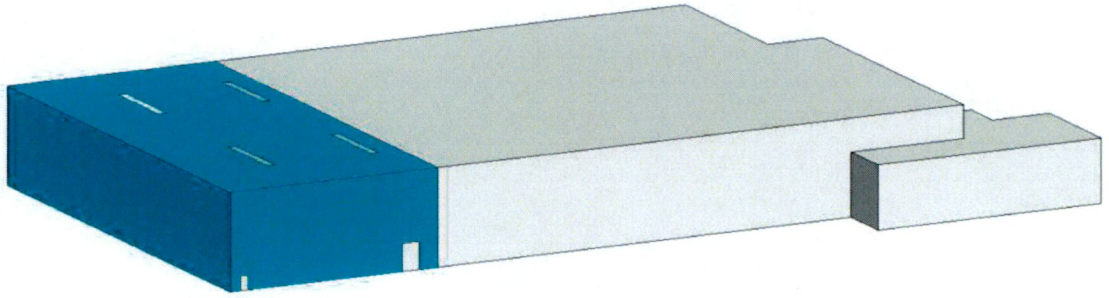
consulting engineers

Project: Origo Warehouse Extension

Report Title: TGD Part L 2021 Compliance Report



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1. INTRODUCTION

Passive Dynamics Sustainability Consultants were appointed in 2022 to ensure that the extension to the Origo Warehouse complies with Guidance Document (TGD) Part L of the Building Regulations. The edition of TGD Part L relevant to this project is 2021 for Non-Domestic Buildings.

The development includes permission for the extension of an existing warehouse by approximately 1,685sqm, and the addition of 1no. loading dock, extension of existing loading yard and upgrade of 11no. parking spaces for E.V charging, 2 spaces to accessible parking spaces, and the addition of 35no. covered bicycle parking spaces all on a site of approximately 1.6 hectares in the townland of Fortunestown. The Mechanical & Electrical services elements to the new extension will include fabric protection heating to the warehouse, power distribution general and emergency lighting, fire protection, security services and external lighting.

As this project is an extension to an existing building the relevant sections of TGD Part L 2021 that apply are as follows:

TGD Part L 2021 Section	Project Complies (Yes / No)
TGD Part L Section 2.1 Building Fabric	**TBC**
TGD Part L Section 2.2 Building Services	**TBC**
TGD Part L Section 2.4 Construction Quality and Commissioning Services	**TBC**
TGD Part L Section 2.5 User Information	**TBC**

Note: The design inputs set out within this report result in a fully compliant building, once the final construction is complete, and all information is available, the table above can be updated to state the project is fully compliant.

2. REQUIRED DOCUMENTATION AT COMPLETION

When completing the Part L compliance report the following information is critical to ensure that the extension to the warehouse complies with part L and that if the building is ever audited that no problems will occur.

2.1 Fabric:

- Images of fabric being installed
- Proof of Purchase
- Data sheets off all building fabric being installed

2.2 Heating Plant:

- Images of the boiler that was selected being installed
- Seasonal Space Heating Energy Efficiency being tested to EU 2281/2016.
- Proof of purchase
- Data Sheets

2.3 Lighting:

- Lighting Schedule
- Lighting Schematic
- Proof of purchase of lights and lighting control
- Images of lights/lighting control installed

2.4 Commissioning Services:

- Commissioning Certs

2.5 User Information:

- Documentation showing user information e.g., drawings
- O&M Manual

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3. BUILDING FABRIC COMPLIANCE

3.1 TGD Part L 2021 Minimum Building Fabric Standards

The extract below from TGD Part L table 1 outlines the minimum performance requirements for each element.

Table 1 Maximum Elemental U-value [1] (W/m^2K)

Column 1 Fabric Elements	Column 2 Area Weighted Average Elemental U-Value (U_m)	Column 3 Average Elemental U-value Individual Element or Section of Element
Roofs[2] Pitched roof - Insulation at ceiling - Insulation on slope Flat roof	 0.16 0.16 0.20	 0.3
Walls[2]	0.21	0.6
Ground Floors[2, 3]	0.21	0.6
Other exposed floors[2]	0.21	0.6
External personnel doors, windows[4] and rooflights[6]	1.6[5]	3.0
Curtain Walling	1.8	3.0
Vehicle access and similar large doors	1.5	3.0
High usage entrance door[7]	3.0	3.0
Swimming Pool Basin[8]	0.25	0.6

Notes:

1. The U-value includes the effect of unheated voids or other spaces.
2. Reasonable provision would also be achieved if the total heat loss through the roof, wall and floor elements did not exceed that which would be the case if each of the area weighted average U-value (Um) for these elements set out in Column 2 were achieved individually.
3. Where the source of space heating is underfloor heating, a floor U-value of 0.15 W/m^2K should generally be satisfactory.
4. Excludes display windows and similar glazing but their impact on overall performance must be taken into account in EPC and CPC calculation.
5. In buildings with high internal heat gains a less demanding area-weighted average U-Value for the glazing may be an appropriate way of reducing overall primary energy and CO_2 emissions. Where this can be shown then the average U-value for windows can be relaxed from the values given above. However values should be no worse than 2.2 W/m^2K.
6. This is the overall U-value including the frame and edge effects, and it relates to the performance of the unit in the vertical plane so, for roof-lights, it must be adjusted for the slope of the roof as described in Section 11.1 of BR 443.
7. High Usage Entrance door means a door to an entrance primarily for the use of people that is expected to experience larger volumes of traffic, and where robustness and/ or powered operation is the main performance requirement. To qualify as a high-usage entrance door the door should be equipped with automatic closers and except where operational requirements preclude it, be protected by a lobby.
8. Where a swimming pool is constructed as part of a new building, reasonable provision should be made to limit heat loss from the pool basin by achieving a U-value no worse than 0.25 W/m^2K as calculated according to BS EN 13370.

Table 1

The scope of work involves an extension to the warehouse. The following U-Values such as roof, rooflight, wall, doors and windows comply with the requirements of TGD Part L 2021 Table 1.

Fabric Element	Maximum Area Weighted U-Values (W/m²°K)
External Walls	**0.21 W/m²°K** (iSBEMie Default 2021 Regulations Ireland)
Exposed Roof	**0.20 W/m²°K** (iSBEMie Default 2021 Regulations Ireland)
Exposed Floor (Ground / Exposed)	**0.21 W/m²°K** (iSBEMie Default 2021 Regulations Ireland)
Personnel Doors	**1.6 W/m²°K** (iSBEMie Default 2021 Regulations Ireland)
Vehicle Access Door	**1.5 W/m²°K** (iSBEMie Default 2021 Regulations Ireland)
Glazing & Rooflight	**1.6 W/m²°K** Light Transmittance = 0.5 G-Value = 0.5 (iSBEMie Default 2021 Regulations Ireland)

Table 2

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4. BUILDING SERVICES COMPLIANCE

4.1 TGD Part L 2021 Minimum Boiler Efficiency Standards

"Heat generators should be designed and installed so that they operate efficiently over the range of loading likely to be encountered. Minimum energy efficiency standards for heat generators in existing buildings are provided in Table 2 for boilers".

The Boiler that is being selected must comply with the table below with evidence of the proposed Seasonal Space Heating Energy Efficiency being tested to EU 2281/2016.

Table 2 Minimum Energy Efficiency Standards for Boiler Systems[1]		
	Gas, Oil and Biomass-fired Boilers	**Seasonal Efficiency (Gross)[2]**
Natural Gas	Single or Multiple boiler system > 70kW and ≤ 400kW output	93%
	Single or Multiple boiler system ≤ 70kW and > 400kW output	86%
LPG	Single or Multiple boiler system > 70kW and ≤ 400kW output	93%
	Single or Multiple boiler system ≤ 70kW and > 400kW output	86%
Oil	Single or Multiple boiler system > 70kW and ≤ 400kW output	93%
	Single or Multiple boiler system ≤ 70kW and > 400kW output	86%
Biomass-independent, automatic, pellet/ woodchip	Single or Multiple boiler system ≤ 20kW output	75%
	Single or Multiple boiler system > 20kW output	77%

Notes:

1. EU Regulations implementing the Eco-design Directive set minimum standards for the efficiency of energy using products that can be placed on the market. Products should also comply with these standards as they come into effect. Current regulations are listed at https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficient-products.

2. Efficiency is the heat output divided by the calorific output of the fuel. The net calorific value of a fuel excludes the latent heat of water vapour in the exhaust, and so is lower than the gross calorific value. Efficiency test results and European standards normally use net calorific values. The calculation methodology for the seasonal efficiency (gross) can be found in NEAP guidance.

Table 3

4.2 TGD Part L 2021 Minimum Lighting Standard

As stated in the TGD Part L 2021 "*General purpose artificial lighting systems shall be designed and controlled so as to ensure the efficient use of energy for this purpose.*"

"Lighting controls in buildings should follow the guidance in BRE Digest 498 Selecting Lighting Controls. Display lighting where provided should be controlled on dedicated circuits that can be switched off when not required. Adequate control depends on the nature and use pattern of the building. This may be achieved by one, or more, of the following means, used alone or in combination, as appropriate. Detailed guidance on the application of the following methods is provided in Table 2 of BRE Digest 498: Selecting Lighting Controls."

a) local manually operated switches in easily accessible positions within each working area or at boundaries between working areas and general circulation routes. The distance on plan from any local switch to the luminaries it controls should generally be not more than 6m, or twice the height of the light fitting above the floor if this is greater.

b) daylight-linked photo-electric switching or dimming for lighting adjacent to windows or other sources of natural light.

c) remote controlled switches operated by infrared transmitter, sonic, ultrasonic or telephone handset controls.

d) automatic switching systems which switch the lighting off when they sense the absence of occupants.

e) time-controlled switches

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5. CONSTRUCTION QUALITY AND COMMISSIONING SERVICES – SECTION 2.4

5.1 General

"2.4.1.1 The requirements of Part L apply to the completed building. Reasonable measures should be taken during construction and appropriate checks and assessments carried out prior to completion to ensure that compliance with Part L is achieved. Subsections 2.4.2 to 2.4.4 give guidance on appropriate measures to satisfy this requirement."

5.2 Insulation Continuity and air Permeability

"The elements that comprise the external fabric of the building should be designed and constructed to ensure that the calculated performance of the building and of its components is achieved in practice. Changes made during design and construction should be assessed for their impact on insulation performance and on air permeability. Those not directly involved in the installation of insulation should be fully aware of the importance of not reducing the effectiveness of the installed insulation through removal or damage. On-site quality control should include checks on the adequacy of insulation installation and of any barriers designed to limit air permeability."

5.3 Commissioning Space and Water Heating Systems

"The heating and hot water system(s) should be commissioned so that at completion, the system(s) and their controls are left in the intended working order and can operate efficiently for the purposes of the conservation of fuel and energy. The design should be reviewed to ensure systems, plant, equipment, and components meet commissionability, maintainability, functionality, usability and operational performance requirements. The key elements of a commissioning plan, identifying the systems that need to be tested and the tests that will be carried out should be developed at the design stage. The BSRIA Job Book A project framework for engineering services BG1/2009 provides further useful information on commissioning of buildings."

5.4 Air Leakage Testing of Ductwork

"Where new systems are installed ductwork leakage testing should be carried out on Class C and Class D ductwork where required by and in accordance with the 73 procedures set out in B&ES DW/143 and B&ES DW/144 on systems served by fans with a design flow greater than 1m3 /s. If ductwork fails to meet the leakage standard, remedial work should be carried out as

necessary to achieve satisfactory performance in retests and further ductwork sections should be tested as set out in DW/143."

6. USER INFORMATION – SECTION 2.5

6.1 General

"*For replacement of services and major renovations the owner or occupants of the building should be provided with sufficient information about the building, the fixed building services and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and energy than is reasonable in the circumstances. A way of complying would be to provide a suitable set of operating and maintenance instructions aimed at achieving economy in the use of fuel and energy in a way that the building owner or occupants can understand. The instructions should be directly related to the particular system(s) installed in the building. Without prejudice to the need to comply with health and safety requirements, the instructions should explain to the building owner or occupier of the building how to operate the system(s) efficiently. This should include:*

a) *Drawings and manuals necessary to operate and maintain the energy using equipment in the buildings, e.g. boilers, chillers, pumps and fans, lighting, building management systems;*

b) *The monitoring of energy use making of adjustments to the control settings for energy using equipment; and*

c) *What routine maintenance is needed to enable operating efficiency to be maintained at a reasonable level through the service life (lives) of the system(s).*