# Project Documentation
# Gebäude-Dokumentation

## Abstract

© Simply Architecture

**Steep Wedge House at Maryborough Hill, Douglas, Co. Cork, Ireland**

### Data of building | Gebäudedaten

| | | | |
|---|---|---|---|
| Year of construction<br>Baujahr | 2017 | **Space heating**<br>**Heizwärmebedarf** | **21.7**<br>**kWh/(m²a)** |
| U-value external wall<br>U-Wert Außenwand | 0.137<br>W/(m²K) | | |
| U-value Floor<br>U-Wert | 0.104<br>W/(m²K) | Primary Energy Renewable (PER)<br>Erneuerbare Primärenergie (PER) | 33.2<br>kWh/(m²a) |
| U-value low roof<br>U-Wert Dach | 0.115<br>W/(m²K) | Non-renewable Primary Energy (PE)<br>Nicht erneuerbare Primärenergie (PE) | 60<br>kWh/(m²a) |
| U-value high roof<br>U-Wert Dach | 0.133<br>W/(m²K) | | |
| Heat recovery<br>Wärmerückgewinnung | 81.2 % | Pressurization test $n_{50}$<br>Drucktest $n_{50}$ | 0,6 $h^{-1}$ |
| U-value window<br>U-Wert Fenster | 0.90<br>W/(m²K) | | |

## Brief Description

# Passive House – Steep Wedge House, Co. Cork, Ireland

The proposed project brief was for a single dwelling for a young family. The project known as 'Steep Wedge House' is a split level 3 bed dwelling on a very difficult sloping site in Douglas, Cork. The key particulars of the project are as follows;

**Project location:** 6 The Fairways, Maryborough Hill, Douglas, Cork
**Site purchase date:** April 2013
**Planning permission secured:** 2015
**Completion:** 2018
**Construction type:** Timber frame construction to passive house standard
**House Area:** 1,900 sq. ft.

The brief called for a family home that would be future proofed in terms of building standards and used systems that made it easier to build on the challenging site. The proposed site was an old dumping yard in a built-up area on the edge of Cork City. The site had suffered several failed planning applications for a one-off house due to three wayleaves traversing the site under which lie county council service pipes. All previous design solutions by previous owners failed to observe enough separation distance from the service pipes and therefore could never satisfy the concerns of the county council. The site was also on a steep slope and located next to a busy motorway. Therefore, to realise the project a series of obstacles needed to be overcome.

A focus on sustainability was key to the design so a fully insulated raft made up of EPS insulation formed the foundation. This reduced the level of digging required and also ensured a thermal bridge free base for the house. The final design revealed several sharp angles which would need to be built with precision. Therefore, the off-site pre-fabricated timber frame system was a perfect solution. A lot of research was invested by the timber frame company in achieving accreditation from The Passive House Institute for their system and this level of expertise was a key advantage for this project. The timber frame system was a highly technical set of components assembled to ensure complete thermal bridge free construction and ease of air tightness. Only renewable insulation products such as wood fibre and cellulose were used and the system used in this particular house is exceptional in terms of the performance levels achieved.

## Responsible project participants
## Verantwortliche Projektbeteiligte

| | |
|---|---|
| Architect<br>Entwurfsverfasser | Gareth Sullivan MRIAI (Simply Architecture)<br>http://www.simplyarchitecture.ie |
| Implementation planning<br>Ausführungsplanung | Gareth Sullivan MRIAI (Simply Architecture)<br>http://www.simplyarchitecture.ie |
| Building systems<br>Haustechnik | ECO Timber Frame<br>EcoTimber – Sustainable, efficient building in Ireland (ecotimbersystems.ie) |
| Structural engineering<br>Baustatik | Hilliard Tanner TSD<br>TSD Ltd: Home |
| Building physics<br>Bauphysik | Evan Finnegan |
| Passive House project planning<br>Passivhaus-Projektierung | Robert Ryan, Earth Cycle Technologies<br>HOME \| earthcycle |
| Construction management<br>Bauleitung | Gareth Sullivan MRIAI (Simply Architecture)<br>http://www.simplyarchitecture.ie |

## Certifying body
## Zertifizierungsstelle

Passivhaus Institut Darmstadt
www.passiv.de

## Certification ID
## Zertifizierungs ID

| | |
|---|---|
| **19964_ECT_PH_20190103_RR** | Project-ID (www.passivehouse-database.org)<br>Projekt-ID (www.passivhausprojekte.de) |

## Author of project documentation
## Verfasser der Gebäude-Dokumentation

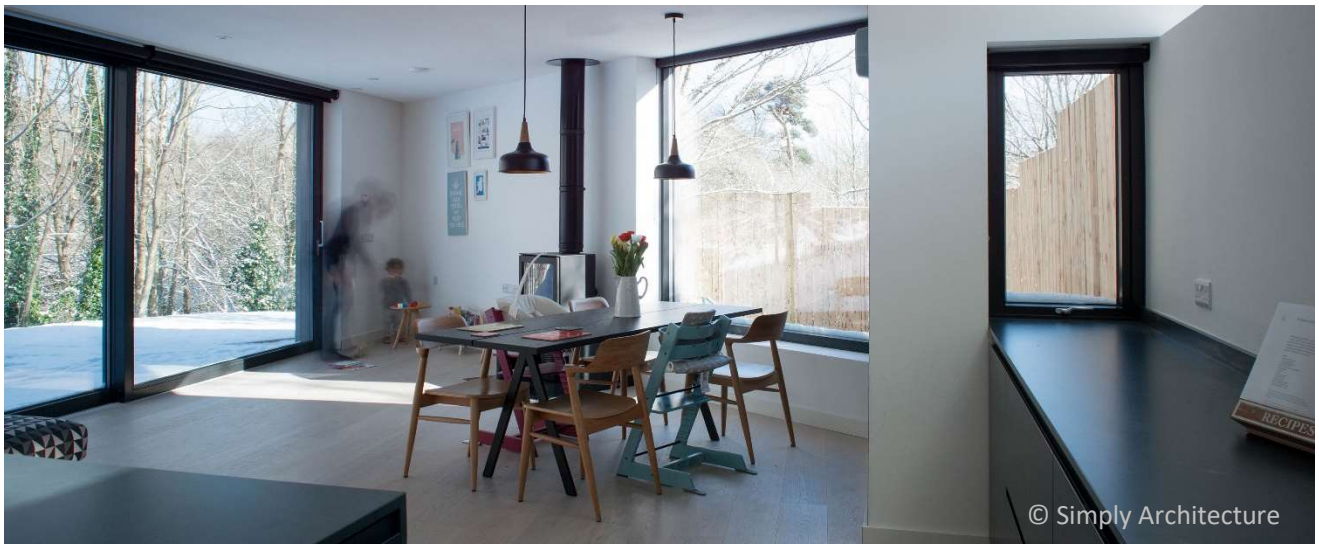
Gareth Sullivan MRIAI (Simply Architecture)
http://www.simplyarchitecture.ie

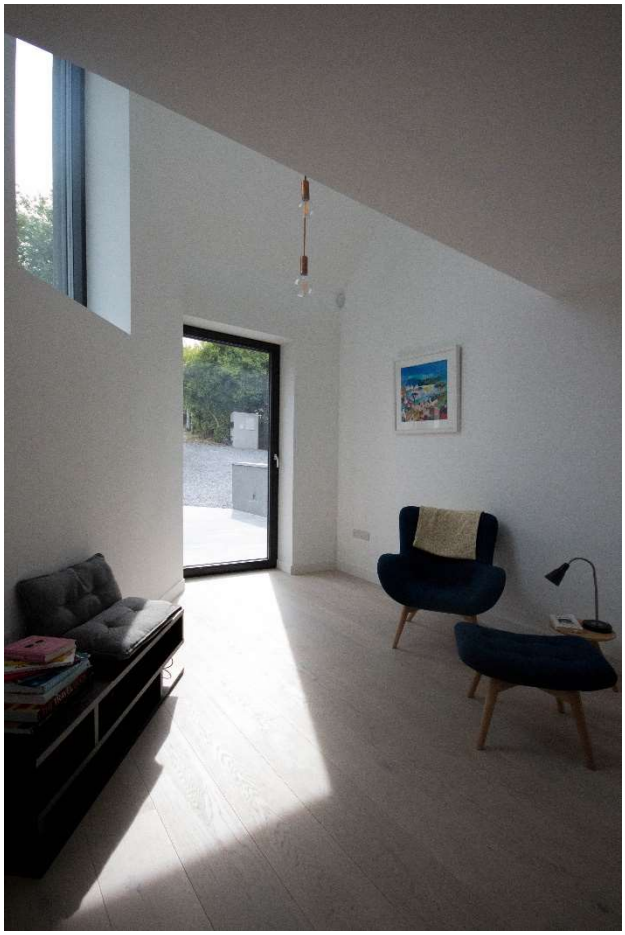
| Date<br>Datum | Signature<br>Unterschrift |
|---|---|
| 17.08.2022 |  |

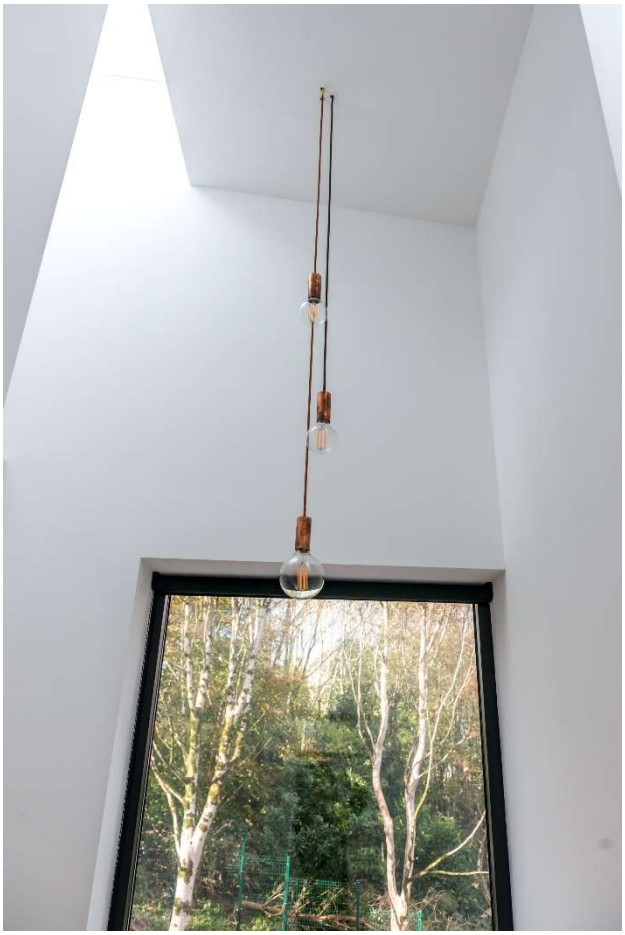
## 1. Exterior Photographs



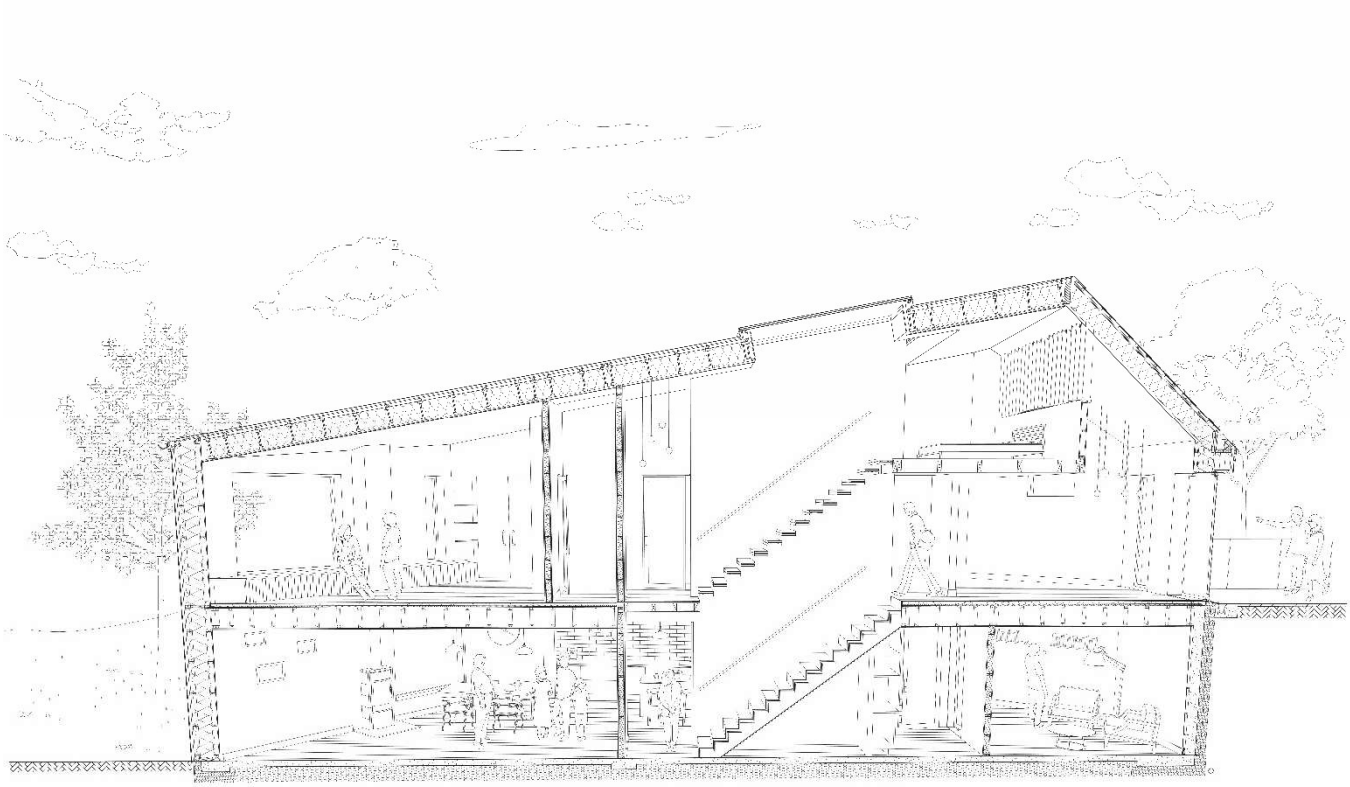
## 2. Interior Photographs



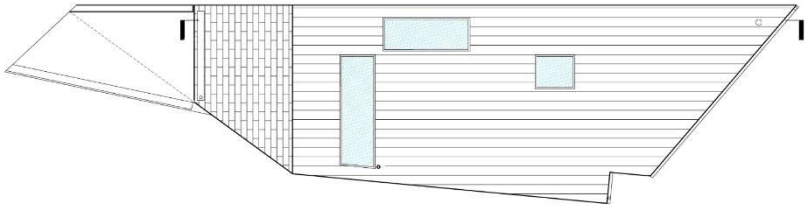




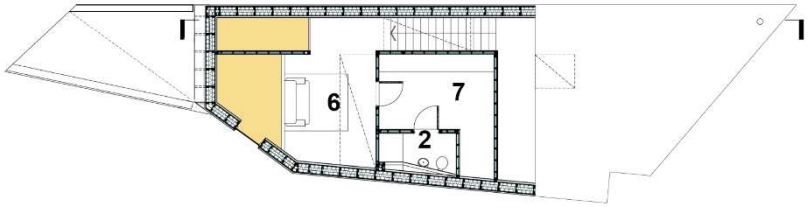
## 3. Section



# 4. Floor Plans

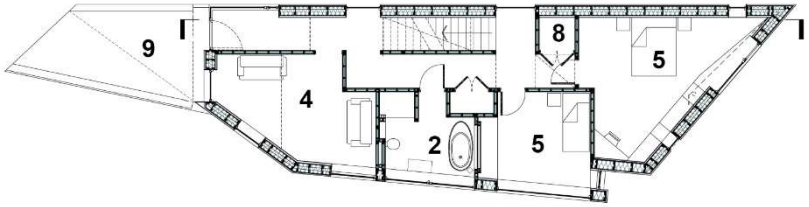


*Roof Plan*

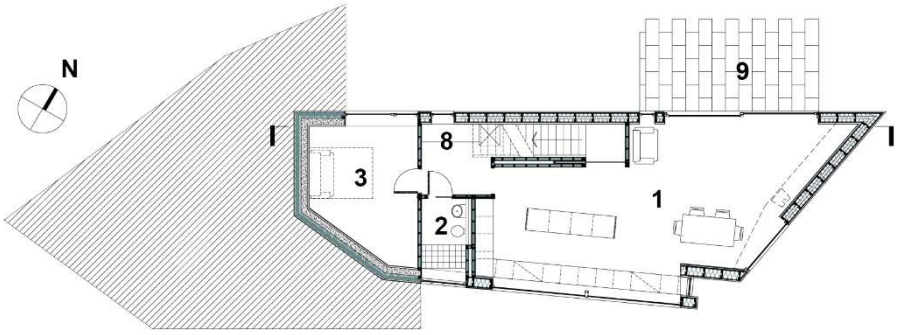



*Mezzanine*

6




*Upper Ground Floor (Entrance Level)*




*Lower Ground Floor (Garden Level)*

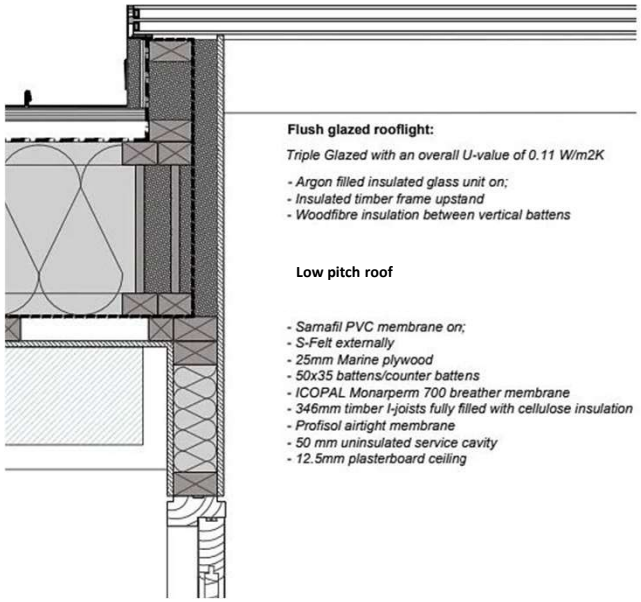
0 5 10

**SCALE BAR**

**KEY:**

*1. Kitchen / Dining / Living*
*2. WC*
*3. Guest Bedroom/ Playroom*
*4. Snug*
*5. Bedroom*
*6. Mezzanine / Bedroom*
*7. Laundry Room / Wardrobe*
*8. Storage*
*9. Patio*

# 5. Roof Details



**Flush glazed rooflight:**

*Triple Glazed with an overall U-value of 0.11 W/m2K*

*- Argon filled insulated glass unit on;*
*- Insulated timber frame upstand*
*- Woodfibre insulation between vertical battens*

**Low pitch roof**

*- Sarnafil PVC membrane on;*
*- S-Felt externally*
*- 25mm Marine plywood*
*- 50x35 battens/counter battens*
*- ICOPAL Monarperm 700 breather membrane*
*- 346mm timber I-joists fully filled with cellulose insulation*
*- Profisol airtight membrane*
*- 50 mm uninsulated service cavity*
*- 12.5mm plasterboard ceiling*

Assembly no. | Interior insulation?

| 04ud | Roof Low Pitched | |
|---|---|---|

Heat transmission resistance [m²K/W]

Orientation of building element: 1-Roof — Interior $R_{si}$: 0.10

Adjacent to: 1-Outdoor air — exterior $R_{se}$: 0.04

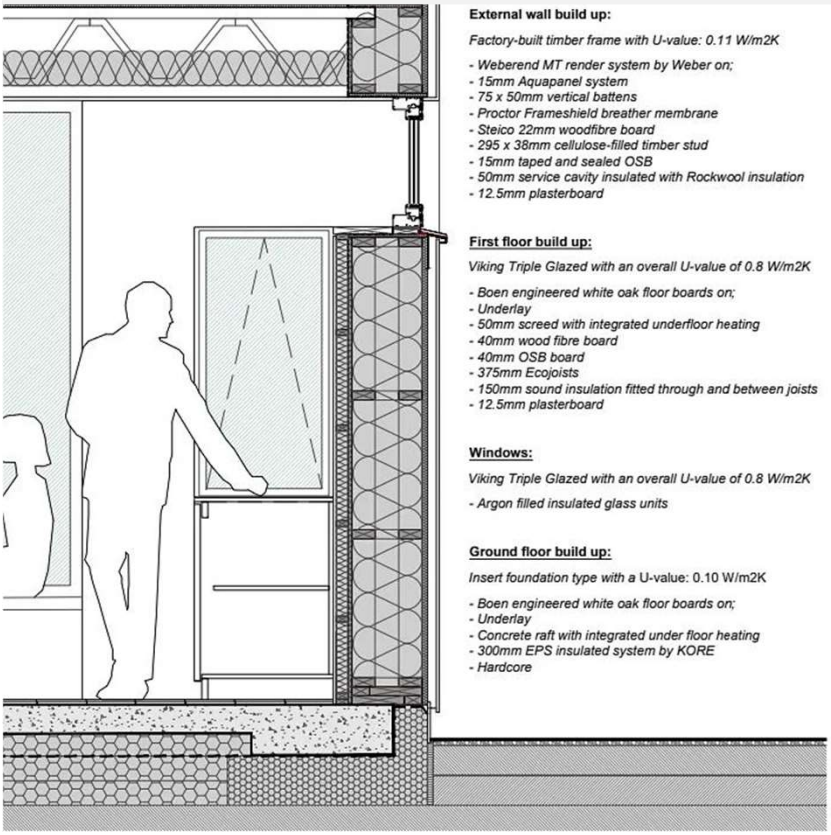
| Area section 1 | λ [W/(mK)] | Area section 2 (optional) | λ [W/(mK)] | Area section 3 (optional) | λ [W/(mK)] | Thickness [mm] |
|---|---|---|---|---|---|---|
| | 0.250 | | | | | 13 |
| | 0.130 | | 0.130 | | | 35 |
| | 0.039 | | | | 0.130 | 356 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| Percentage of sec. 1 | Percentage of sec. 2 | Percentage of sec. 3 | Total |
|---|---|---|---|
| 71% | 24.0% | 5.0% | 40.4 cm |

U-value supplement: W/(m²K)

**U-value: 0.115** W/(m²K)

# 6. Wall Details



**External wall build up:**

*Factory-built timber frame with U-value: 0.11 W/m2K*

- *Weberend MT render system by Weber on;*
- *15mm Aquapanel system*
- *75 x 50mm vertical battens*
- *Proctor Frameshield breather membrane*
- *Steico 22mm woodfibre board*
- *295 x 38mm cellulose-filled timber stud*
- *15mm taped and sealed OSB*
- *50mm service cavity insulated with Rockwool insulation*
- *12.5mm plasterboard*

**First floor build up:**

*Viking Triple Glazed with an overall U-value of 0.8 W/m2K*

- *Boen engineered white oak floor boards on;*
- *Underlay*
- *50mm screed with integrated underfloor heating*
- *40mm wood fibre board*
- *40mm OSB board*
- *375mm Ecojoists*
- *150mm sound insulation fitted through and between joists*
- *12.5mm plasterboard*

**Windows:**

*Viking Triple Glazed with an overall U-value of 0.8 W/m2K*

- *Argon filled insulated glass units*

**Ground floor build up:**

*Insert foundation type with a* U-value: 0.10 W/m2K

- *Boen engineered white oak floor boards on;*
- *Underlay*
- *Concrete raft with integrated under floor heating*
- *300mm EPS insulated system by KORE*
- *Hardcore*

Unheated / unbooled attic -> (on the right)

| Assembly no. | Building assembly description | | | | | | Interior insulation? |
|---|---|---|---|---|---|---|---|
| 01ud | Wall | | | | | | |

Heat transmission resistance [m²K/W]

Orientation of building element: 2-Wall — interior $R_{si}$: 0.13

Adjacent to: 3-Ventilated — exterior $R_{se}$: 0.13

| Area section 1 | λ [W/(mK)] | Area section 2 (optional) | λ [W/(mK)] | Area section 3 (optional) | λ [W/(mK)] | Thickness [mm] |
|---|---|---|---|---|---|---|
| | 0.050 | | | | | 22 |
| | 0.039 | | 0.130 | | | 89 |
| | 0.039 | | | | | 81 |
| | 0.039 | | 0.130 | | | 89 |
| | 0.130 | | | | | 15 |
| | 0.120 | | | | 0.130 | 55 |
| | 0.250 | | | | | 13 |
| | | | | | | |

| Percentage of sec. 1 | Percentage of sec. 2 | Percentage of sec. 3 | Total |
|---|---|---|---|
| 80% | 9.5% | 11.0% | 36.4 cm |

U-value supplement: W/(m²K)

**U-value: 0.137** W/(m²K)

# 7. Floor

- 300mm EPS insulated base by KORE
- Concrete floor base with reinforced steel mesh
- Integrated underfloor heating system

| Assembly no. | | | | | | Interior insulation? |
|---|---|---|---|---|---|---|
| 02ud | Floor | | | | | |

Heat transmission resistance [m²K/W]

| | | | |
|---|---|---|---|
| Orientation of building element | 3-Floor | interior $R_{si}$ | 0.17 |
| Adjacent to | 2-Ground | exterior $R_{se}$ | 0.00 |

| Area section 1 | λ [W/(mK)] | Area section 2 (optional) | λ [W/(mK)] | Area section 3 (optional) | λ [W/(mK)] | Thickness [mm] |
|---|---|---|---|---|---|---|
| EPS 100 | 0.032 | | | | | 100 |
| EPS 100 | 0.032 | | | | | 200 |
| Concrete Floor | 2.300 | | | | | 200 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| Percentage of sec. 1 | Percentage of sec. 2 | Percentage of sec. 3 | Total |
|---|---|---|---|
| 100% | | | 50.0 cm |

U-value supplement: W/(m²K)

**U-value: 0.104** W/(m²K)

## 8. Air Tightness

Profisol airt tightness membrane to ceilings
Taped onto OSB board that acts as air tightness layer to walls with all joints taped and sealed.

Cellulose insulation pump filled within ceiling and wall voids and all penetration points sealed with air tightness tape

# Passive House Verification (including air tightness test results)

| | | | | | |
|---|---|---|---|---|---|
| **Building:** | Steep Wedge House | | | | |
| Street: | 6 The Fairways, Maryborough Hill | | | | |
| Postcode/City: | | Douglas, Cork | | | |
| Province/Country: | | | IE-Ireland | | |
| Building type: | Dwelling House | | | | |
| Climate data set: | IE0003a-Cork | | | | |
| Climate zone: | 3: Cool-temperate | | Altitude of location: | 66 m | |
| **Home owner / Client:** | Gareth & Barbara Sullivan | | | | |
| Street: | 6 The Fairways, Maryborough Hill | | | | |
| Postcode/City: | | Douglas, Cork | | | |
| Province/Country: | | | IE-Ireland | | |
| **Architecture:** | Simply Architecture | | | | |
| Street: | 18A Washington Street | | | | |
| Postcode/City: | | Cork | | | |
| Province/Country: | Ireland | | | | |
| **Mechanical engineer:** | Energywise Ireland | | | | |
| Street: | Unit 6, North Point Business Park, New Mallow Rd. | | | | |
| Postcode/City: | | Cork | | | |
| Province/Country: | | | IE-Ireland | | |
| **Energy consultancy:** | Evan Finnegan | | | | |
| Street: | Lane Business Park, Monahan Road | | | | |
| Postcode/City: | | Cork | | | |
| Province/Country: | | | | | |
| **Certification:** | Earth Cycle Technologies | | | | |
| Street: | 10 Springfield | | | | |
| Postcode/City: | A67F863 | | | | |
| Province/Country: | Ireland | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Year of construction: | 2018 | Interior temperature winter [°C]: | 20.0 | Interior temp. summer [°C]: | 25.0 |
| No. of dwelling units: | 1 | Internal heat gains (IHG) heating case [W/m²]: | 2.4 | IHG cooling case [W/m²]: | 2.6 |
| No. of occupants: | 3.0 | Specific capacity [Wh/K per m² TFA]: | 84 | Mechanical cooling: | |

| | | | | Criteria | Alternative criteria | Fullfilled?[2] |
|---|---|---|---|---|---|---|
| | Treated floor area m² | 177.7 | | | | |
| **Space heating** | Heating demand kWh/(m²a) | 21.71 | ≤ | 15 | - | yes |
| | Heating load W/m² | 10.45 | ≤ | - | 10 | |
| **Space cooling** | Cooling & dehum. demand kWh/(m²a) | - | ≤ | - | - | - |
| | Cooling load W/m² | - | ≤ | - | - | |
| | Frequency of overheating (> 25 °C) % | 6 | ≤ | 10 | | yes |
| | Frequency of excessively high humidity (> 12 g/kg) % | 0 | ≤ | 20 | | yes |
| **Airtightness** | Pressurization test result $n_{50}$ 1/h | 0.6 | ≤ | 0.6 | | yes |
| **Non-renewable Primary Energy (PE)** | PE demand kWh/(m²a) | 60 | ≤ | 105 | | yes |
| **Primary Energy Renewable (PER)** | PER demand kWh/(m²a) | 33 | ≤ | - | - | - |
| | Generation of renewable energy (in relation to projected building footprint area) kWh/(m²a) | - | ≥ | - | - | |

[2] Empty field: Data missing; '-': No requirement

I confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The PHPP calculations are attached to this verification.

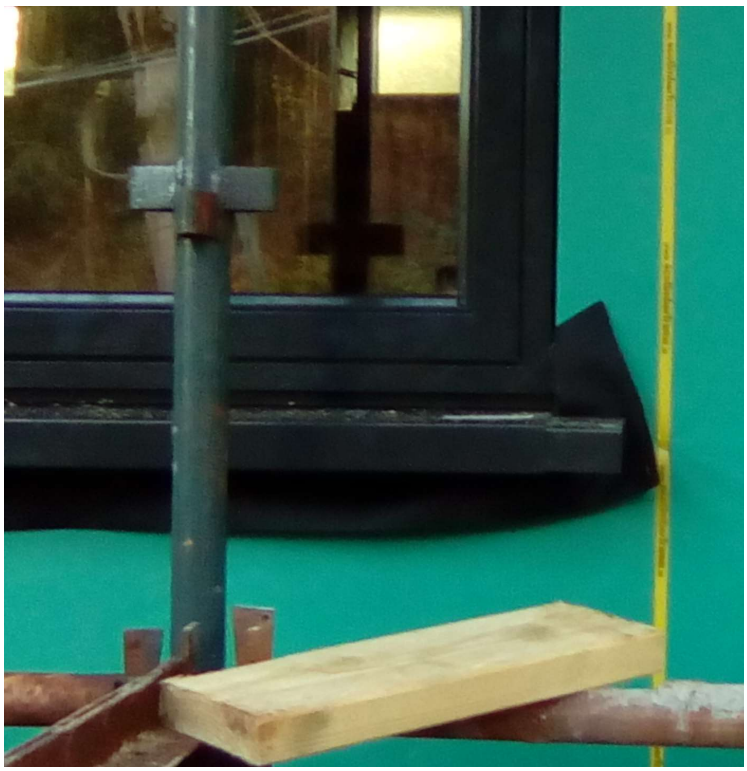
**Passive House Classic?** yes

| Task: | First name: | Surname: | Signature: |
|---|---|---|---|
| 2-Certifier | Robert | Ryan | |

| Certificate ID | Issued on: | City: |
|---|---|---|
| 19964_ECT_PH_20190103_RR | 02/02/19 | Wicklow |

Project data imported from designPH 1.4.0d BETA — PHPP9 display.code: 788465141_131015_PHIDE_en09

# 9. Windows




Alu-clad triple glazed wood Windows.

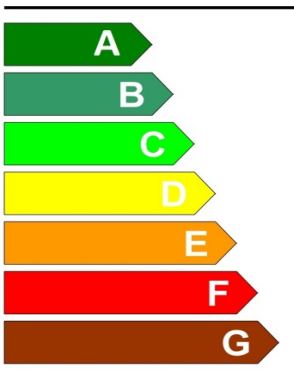
Air tight tape to entire perimeter of interior and SIGA Wigluv wind tightness tape to exterior

(Additional specific details of all Windows on following pages)

# Viking DK88 Panel Door // Chromatec Ultra spacer bar

**Door Set Energy Rating Label:**

**Viking Window AS**
**Viking DK88 Panel Door**




**Energy Index: -66.0 kWh/m²/year**

This is based on UK climate zone using the Approved Document L1B energy balance calculation formula and BFRC's amendments:

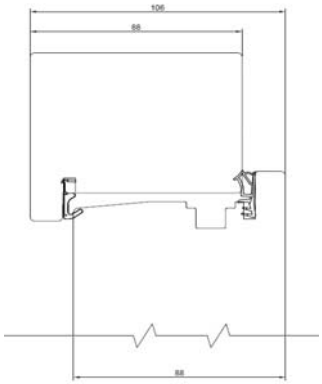
**– 68.5 x ($U_w$ + (0,0165 x AL))**

and initial type testing data of standard door with dimensions **1230 x 2180 mm (W x H).**

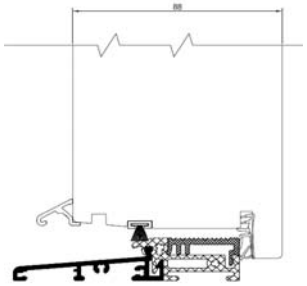
| | |
|---|---|
| **Thermal Transmittance ($U_w$)** | **0,95 W/m²K** |
| **Effective Air Leakage ($L_{factor}$)** | **0,74 W/m²K** |

*This label is not a certification mark. It is provided by Viking Window AS as a customer service to allow consumers to compare energy performance of competing products. The actual energy performance of any specific product depends on its size, design, installation etc.*

**Cross section of head:**



**Cross section of threshold:**



**Test results according EN 14351:**

| | |
|---|---|
| **Air permeability:** | **Class 4** |
| **L (50 Pa; m³/hm²):** | **0,74** |
| **Water tightness:** | **Class 7A** |
| **Resistance to Wind Load:** | **NPD** |

**Thermal properties according EN ISO 10077-2:**

| | |
|---|---|
| **Uf =** | **1,24** W/m²K * |
| **Uw =** | **0,95** W/m²K |
| **Ψ =** | **0,041** W/mK ** |

** Weighted average*

*** With Chromatec Ultra*

**Glazing data according EN 410:** *3k 4PlthUN-4-4PlthUN; 18/20 mm spacer 90% Argon*
*50 mm total thickness of IGU*

**U ***=** 0,65 **W/m²K**
**g=** 0,52

**Door Set Energy Rating according BR Approved Document L1B:**

*with the exception of glazing and g-value*

**DSER = - 68,5 x (Uw + (0,0165 x AL))**
**DSER = -65,97 kWh/m²/year**

**DSER BAND: A**

| | |
|---|---|
| ≥-70 | A |
| ≤-70 to ≥-85 | B |
| ≤-85 to ≥-100 | C |
| ≤-100 to ≥-115 | D |
| ≤-115 to ≥-130 | E |
| ≤-130 to ≥-145 | F |
| ≤-145 | G |

*DSER Band labels as given on BFRC's manual*

## Calculation of thermal transmittance of standard door according EN ISO 10077-1:

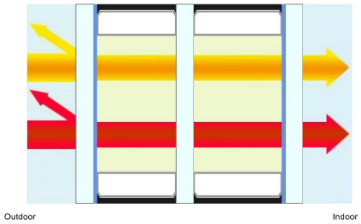
| PARAMETER | VALUE | UNIT | DIMENSIONS | VALUE | UNIT |
|---|---|---|---|---|---|
| VISIBLE GLAZING AREA (Ag): | 1,71 | $m^2$ | **Height (h):** | 2,180 | m |
| U-VALUE FOR GLASS (Ug): | 0,65 | $W/m^2K$ | **Width (w):** | 1,230 | m |
| AREA OF FRAMES (Af): | 0,97 | $m^2$ | ***Profile head:*** | 0,164 | m |
| Uf: | 1,24 | | ***Profile threshold:*** | 0,120 | m |
| Linear thermal transmittance (Ψ) ** | 0,041 | $W/m^2K$ | **U *** :** | 0,65 | $W/m^2K$ |
| VISIBLE GLAZING PERIMETER (Lg): | 5,596 | m | **g :** | 0,52 | |
| Frame factor f: | 0,36 | | **Uw** | **0,95** | **$W/m^2K$** |
| *** With Chromatec Ultra* | | | ***g (door):*** | **0,33** | ***fully glazed door set*** |
| **** Door leaf without frame* | | | | | |

## Glazing data:

SAINT-GOBAIN

Calumen® II 1.3.8
19 January 2018
Data base : Europe Database

**Glazing design**




| | First glazing | Second glazing | Third glazing |
|---|---|---|---|
| Gas | | Argon 90% 18.00mm | Argon 90% 20.00mm |
| Coating | | | PLANITHERM ULTRA N II |
| First glass | PLANICLEAR 4.00mm | PLANICLEAR 4.00mm | PLANICLEAR 4.00mm |
| Coating | PLANITHERM ULTRA N II | | |
| Layer | | | |
| Coating | | | |
| Second glass | | | |
| Coating | | | |

**Sound transmission loss**

**Rw(C;Ctr) = 30(-1;-6) dB**
Acoustic simulated values

Burglar resistance EN356 : **NPD**

**Manufacturing sizes**

Nominal thickness : **50.0** **mm**
Weight : **30.0** **kg/m²**

**Luminous factors (EN410-2011) : (D65 2°)**

Transmittance : **71** **%**
Outdoor reflectance : **16** **%**
Indoor reflectance : **16** **%**

**Energy factors (EN410-2011) :**

Transmittance : **45** **%**
Outdoor reflectance : **33** **%**
Indoor reflectance : **33** **%**
Absorptance A1 : **13** **%**
Absorptance A2 : **4** **%**
Absorptance A3 : **5** **%**

**Solar factors (EN410-2011) :**

g : **0.52**
Shading coefficient : **0.59**

**Thermal transmission (EN673-2011) - 0° related to vertical position**

Ug : **0.53** **W/(m².K)**

Calumen II

Indrek Rüütel
Viking Window AS
R&D
Paide, Mäo
72751
Estonia

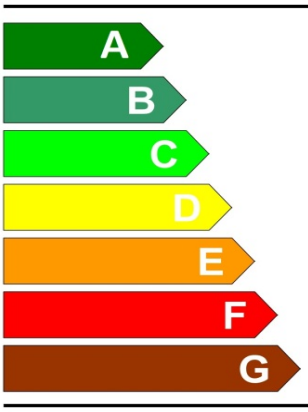
Phone : +372 384 8900
Mobile :
Fax :
viking@viking.ee

# Viking SW14 Aluclad Window

## Planitherm Xn glazing; Chromatec Ultra

**Window Energy Rating Label:**

**Viking Window AS**
**Viking SW14 Aluclad Window**




**Energy Index: 24.4 kWh/m²/year**

This is based on UK climate zone using the Approved Document L1B energy balance calculation formula:

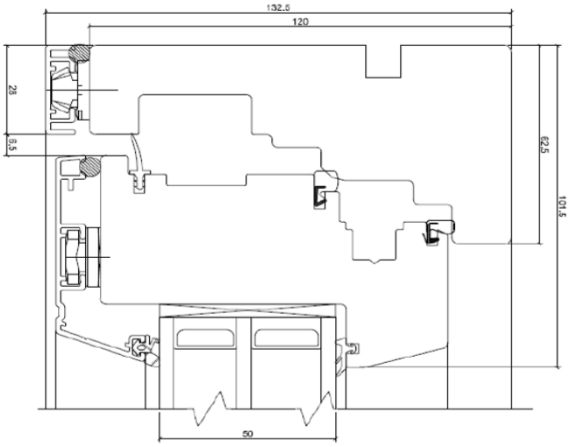
**196,7 x ((1-f) x $g_{glass}$) – 68.5 x ($U_w$ + (0,0165 x AL))**

and initial type testing data of standard window with dimensions **1230 x 1480 mm (W x H).**

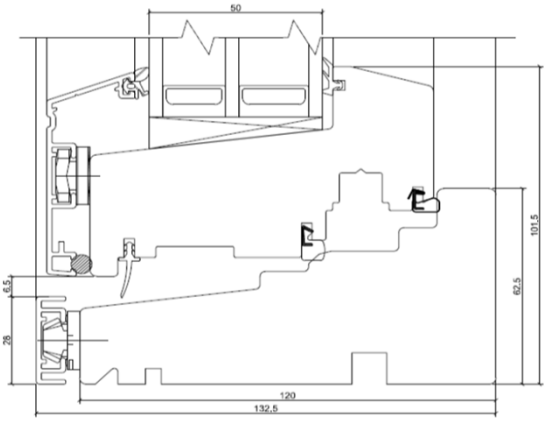
| | |
|---|---|
| **Thermal Transmittance ($U_w$)** | **0,76 W/m²K** |
| **Solar Factor ($g_{window}$)** | **0,39** |
| **Effective Air Leakage ($L_{factor}$)** | **0,00 W/m²K** |

*This label is not a certification mark. It is provided by Viking Window AS as a customer service to allow consumers to compare energy performance of competing products. The actual energy performance of any specific product depends on its size, design, installation etc.*

**Cross section of head and jamb:**



**Cross section of cill:**



**Test results according EN 14351:**

| | |
|---|---|
| **Air permeability:** | **Class 4** |
| **L (50 Pa; m³/hm²):** | **0,00** |
| **Water tightness:** | **E1500** |
| **Resistance to Wind Load:** | **Class 4C** |

**Thermal properties according EN ISO 10077-2:**

| | |
|---|---|
| **Uf =** | **0,98** W/m²K * |
| **Uw =** | **0,76** W/m²K |
| **Ψ =** | **0,041** W/mK ** |

** Weighted average*

*** With Chromatec Ultra*

**Glazing data according EN 410:** *3k 4LowE-4-4LowE; 18/20 mm spacer 90% Argon*
*50 mm total thickness of IGU*

**Ug=** 0,53 **W/m²K**
**g=** 0,54

**Window Energy Rating according BR Approved Document L1B:**

**WER = 196,7 x ((1 - f) x g glass) - 68,5 x (Uw + (0,0165 x AL))**

**WER = 24,43 kWh/m²/year**

**WER BAND: A**

The following rating bands define the window energy rating label:

| | | | |
|---|---|---|---|
| Band A | | WER | ⩾ 0 |
| Band B | 0 > | WER | ⩾ –10 |
| Band C | –10 > | WER | ⩾ –20 |
| Band D | –20 > | WER | ⩾ –30 |
| Band E | –30 > | WER | ⩾ –50 |
| Band F | –50 > | WER | ⩾ –70 |
| Band G | –70 > | WER | |

**Calculation of thermal transmittance of standard window according EN ISO 10077-1:**

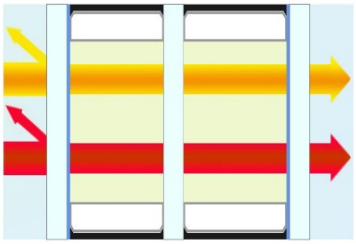
| PARAMETER | VALUE | UNIT | DIMENSIONS | VALUE | UNIT |
|---|---|---|---|---|---|
| VISIBLE GLAZING AREA (Ag): | 1,31 | m² | **Height (h):** | 1,480 | m |
| U-VALUE FOR GLASS (Ug): | 0,53 | W/m²K | **Width (w):** | 1,230 | m |
| AREA OF FRAMES (Af): | 0,51 | m² | ***Profile head:*** | 0,102 | m |
| Uf: | 0,98 | W/m²K | ***Profile cill:*** | 0,102 | m |
| Linear thermal transmittance** (Ψ) | 0,041 | W/m²K | **Ug** | 0,53 | W/m²K |
| VISIBLE GLAZING PERIMETER (Lg): | 4,608 | m | **g** | 0,54 | |
| Frame factor f: | 0,28 | | **Uw** | **0,76** | **W/m²K** |
| *** With Chromatec Ultra* | | | **g =** | **0,39** | |

## Glazing data:

SAINT-GOBAIN Viking

Calumen® II 1.3.4
15 March 2016
Data base : SGG Nordic

### Glazing design




| | First glazing | Second glazing | Third glazing |
|---|---|---|---|
| Gas | | Argon 90% 18.00mm | Argon 90% 20.00mm |
| Coating | | | PLANITHERM XN |
| First glass | PLANICLEAR 4.00mm | PLANICLEAR 4.00mm | PLANICLEAR 4.00mm |
| Coating | PLANITHERM XN | | |
| Layer | | | |
| Coating | | | |
| Second glass | | | |
| Coating | | | |

### Sound transmission loss

Acoustics simulated values : **Rw(C;Ctr) = 30(-1;-6) dB**

### Manufacturing sizes

Nominal thickness : **50.0 mm**
Weight : **30.0 kg/m²**

### Luminous factors (EN410-2011) : (D65 2°)

Transmittance : **74 %**
Outdoor reflectance : **14 %**
Indoor reflectance : **14 %**

### Energy factors (EN410-2011) :

Transmittance : **48 %**
Outdoor reflectance : **32 %**
Indoor reflectance : **32 %**
Absorptance A1 : **11 %**
Absorptance A2 : **4 %**
Absorptance A3 : **5 %**

### Solar factors (EN410-2011) :

g : **0.54**
Shading coefficient : **0.63**

### Thermal transmission (EN673-2011) - 0° related to vertical position

Ug : **0.5 W/(m².K)**



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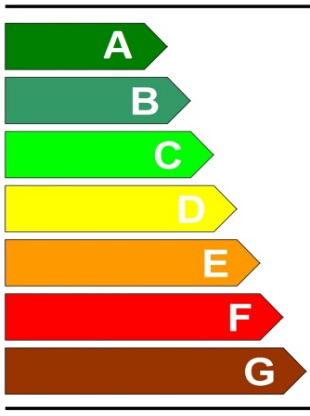
# Viking DK13 Window - 3 glazed

**Window Energy Rating Label:**

**Viking Window AS**
**Viking DK13 Aluclad Window - 3 glazed**
**A-rated**




**Energy Index: 5,7 kWh/m²/year**

This is based on UK climate zone using the Approved Document L1B energy balance calculation formula:

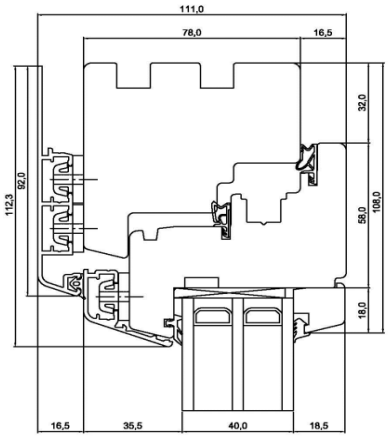
**196,7 x ((1-f) x $g_{glass}$) – 68.5 x ($U_w$ + (0,0165 x AL))**

and initial type testing data of standard window with dimensions **1230 x 1480 mm (W x H).**

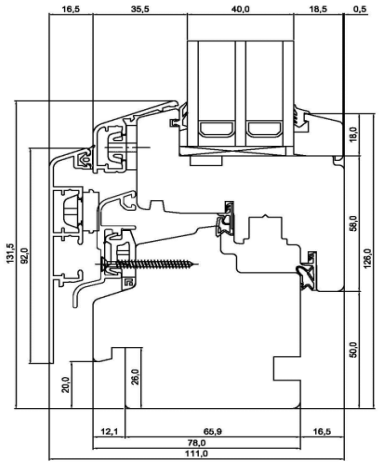
| | |
|---|---|
| Thermal Transmittance ($U_w$) | 0,92 W/m²K |
| Solar Factor ($g_{window}$) | 0,35 |
| Effective Air Leakage ($L_{factor}$) | 0,00 W/m²K |

*This label is not a certification mark. It is provided by Viking Window AS as a customer service to allow consumers to compare energy performance of competing products. The actual energy performance of any specific product depends on its size, design, installation etc.*

**Cross section of head:**




**Cross section of cill:**




**Test results according EN 14351:**

| | |
|---|---|
| **Air permeability:** | **Class 4** |
| **L (50 Pa; m³/hm²):** | **0,00** |
| **Water tightness:** | **Class E1050** |
| **Resistance to Wind Load:** | **Class 4C** |

**Thermal properties according EN ISO 10077-2:**

| | |
|---|---|
| **Uf =** | **1,21** W/m²K * |
| **Uw =** | **0,92** W/m²K |
| **Ψ =** | **0,043** W/mK ** |

** Weighted average*

*** With Chromatech Ultra*

**Glazing data according EN 410:** *3k 4PlthUN-4-4PlthUN; 14/14 mm spacer 90% Argon*
*40 mm total thickness of IGU*

**Ug=** 0,64 **W/m²K**
**g=** 0,50

**Window Energy Rating according BR Approved Document L1B:**

**WER = 196,7 x ((1 - f) x g glass) - 68,5 x (Uw + (0,0165 x AL))**

**WER = 5,71 kWh/m²/year**

**WER BAND: A**

The following rating bands define the window energy rating label:

| | |
|---|---|
| Band A | WER ⩾ 0 |
| Band B | 0 > WER ⩾ –10 |
| Band C | –10 > WER ⩾ –20 |
| Band D | –20 > WER ⩾ –30 |
| Band E | –30 > WER ⩾ –50 |
| Band F | –50 > WER ⩾ –70 |
| Band G | –70 > WER |

## Calculation of thermal transmittance of standard window according EN ISO 10077-1:

| PARAMETER | VALUE | UNIT | DIMENSIONS | VALUE | UNIT |
|---|---|---|---|---|---|
| VISIBLE GLAZING AREA (Ag): | 1,26 | m² | **Height (h):** | 1,480 | m |
| U-VALUE FOR GLASS (Ug): | 0,64 | W/m²K | **Width (w):** | 1,230 | m |
| AREA OF FRAMES (Af): | 0,56 | m² | ***Profile head:*** | 0,108 | m |
| Uf: | 1,21 | W/m²K | ***Profile cill:*** | 0,126 | m |
| Linear thermal transmittance ** (Ψ) | 0,043 | W/m²K | **Ug** | 0,64 | W/m²K |
| VISIBLE GLAZING PERIMETER (Lg): | 4,52 | m | **g** | 0,50 | |
| Frame factor f: | 0,31 | | **Uw** | **0,92** | **W/m²K** |
| *** With Chromatech Ultra* | | | **g =** | **0,35** | |

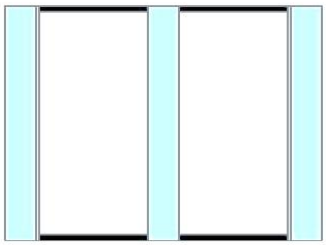
## Glazing data:

SAINT-GOBAIN GLASS

Viking

Calumen® II 1.2.4
19 February 2013
Data base : SGG Nordic

### Glazing design




| | First glazing | Second glazing | Third glazing |
|---|---|---|---|
| Gas | | Argon 90% 14.00mm | Argon 90% 14.00mm |
| Coating | | | PLANITHERM ULTRA N |
| First glass | PLANILUX 4.00mm | PLANILUX 4.00mm | PLANILUX 4.00mm |
| Coating | PLANITHERM ULTRA N | | |
| Layer | | | |
| Coating | | | |
| Second glass | | | |
| Coating | | | |

### Manufacturing sizes

Nominal thickness : **40.0** **mm**
Weight : **30.0** **kg/m²**

### Luminous factors (EN410-2011) :

Transmittance : **71** **%**
Outdoor reflectance : **15** **%**
Indoor reflectance : **15** **%**

### Energy factors (EN410-2011) :

Transmittance : **42** **%**
Outdoor reflectance : **31** **%**
Indoor reflectance : **31** **%**
Absorptance A1 : **16** **%**
Absorptance A2 : **5** **%**
Absorptance A3 : **6** **%**

Solar factor g : **0.50**
Shading coefficient : **0.58**

### Thermal transmission (EN673-2011) - 0° related to vertical position

Ug : **0.6** **W/(m².K)**

Calumen II

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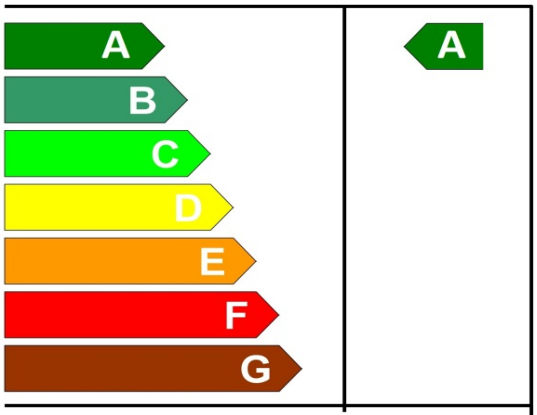
# Viking GU Lift-and-Slide Patio Door

## Planitherm Xn; Swisspacer Ultimate

**Window Energy Rating Label:**

**Viking Window AS**
**GU Lift and Slide Patio Door**




**Energy Index: 0.5 kWh/m²/year**

This is based on UK climate zone using the Approved Document L1B energy balance calculation formula:

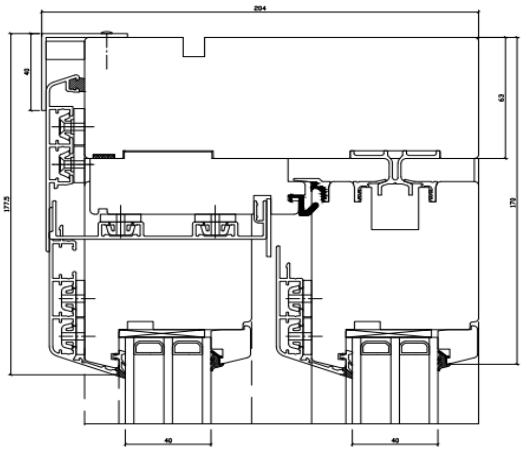
**196,7** x **((1-f)** x $g_{glass}$) – **68.5** x ($U_w$ + **(0,0165** x **AL))**

and initial type testing data of standard door with dimensions **2100 x 2100 mm (W x H).**

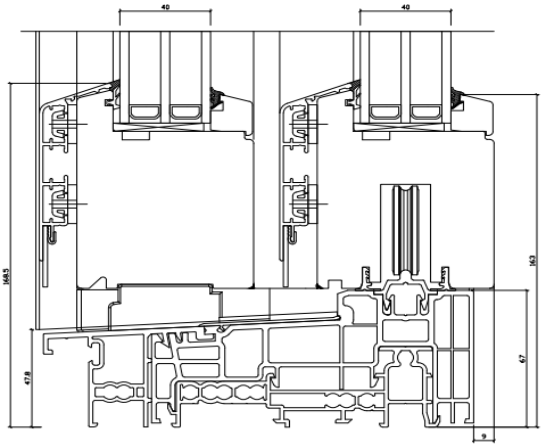
| | |
|---|---|
| Thermal Transmittance ($U_w$) | 1.00 W/m²K |
| Solar Factor ($g_{window}$) | 0,35 |
| Effective Air Leakage ($L_{factor}$) | 0,00 W/m²K |

*This label is not a certification mark. It is provided by Viking Window AS as a customer service to allow consumers to compare energy performance of competing products. The actual energy performance of any specific product depends on its size, design, installation etc.*

**Cross section of head:**



**Cross section of cill:**



**Test results according EN 14351:**

| | |
|---|---|
| **Air permeability:** | **Class 4** |
| **L (50 Pa; m³/hm²):** | **0,04** |
| **Water tightness:** | **E750** |
| **Resistance to Wind Load:** | **Class 4C** |

**Thermal properties according EN ISO 10077-2:**

| | |
|---|---|
| **Uf =** | **1,28** W/m²K * |
| **Uw =** | **1,00** W/m²K |
| **Ψ =** | **0,027** W/mK ** |

** Weighted average*

*** With Swisspacer Ultimate*

**Glazing data according EN 410:** *3k 4PlthUN-4-4PlthUN; 14/14 mm spacer 90% Argon*
*40 mm total thickness of IGU*

**Ug=** 0,77 **W/m²K**
**g=** 0,53

**Window Energy Rating according BR Approved Document L1B:**

**WER = 196,7 x ((1 - f) x g glass) - 68,5 x (Uw + (0,0165 x AL))**

**WER = 0,55 kWh/m²/year**

**WER BAND: A**

The following rating bands define the window energy rating label:

| | |
|---|---|
| Band A | WER ≥ 0 |
| Band B | 0 > WER ≥ –10 |
| Band C | –10 > WER ≥ –20 |
| Band D | –20 > WER ≥ –30 |
| Band E | –30 > WER ≥ –50 |
| Band F | –50 > WER ≥ –70 |
| Band G | –70 > WER |

**Calculation of thermal transmittance of standard window according EN ISO 10077-1:**

| PARAMETER | VALUE | UNIT | DIMENSIONS | VALUE | UNIT |
|---|---|---|---|---|---|
| VISIBLE GLAZING AREA (Ag): | 2,93 | m² | **Height (h)***:** | 2,100 | m |
| U-VALUE FOR GLASS (Ug): | 0,77 | W/m²K | **Width (w)***:** | 2,100 | m |
| AREA OF FRAMES (Af): | 1,48 | m² | ***Width of leaf*** | 1,050 | m |
| Uf: | 1,28 | W/m²K | ***Profile head:*** | 0,167 | m |
| Linear thermal transmittance** (Ψ) | 0,027 | W/m²K | ***Profile cill:*** | 0,180 | m |
| VISIBLE GLAZING PERIMETER (Lg): | 10,36 | m | ***Profile middle:*** | 0,099 | |
| Frame factor f: | 0,33 | | ***Profile jamb:*** | 0,160 | |
| | | | **Ug** | 0,77 | W/m²K |
| | | | **g** | 0,53 | |
| | | | **Uw** | **1,00** | **W/m²K** |
| | | | **g =** | **0,35** | |

*** With Swisspacer Ultimate*

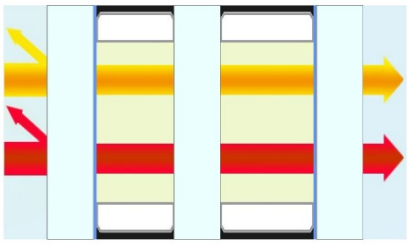
*** Standard size door: 2.1 x 2.1 m

## Glazing data:

SAINT-GOBAIN Viking

Calumen® II 1.3.4
18 March 2016
Data base : SGG Nordic

### Glazing design




| | First glazing | Second glazing | Third glazing |
|---|---|---|---|
| Gas | | Argon 90% 10.00mm | Argon 90% 12.00mm |
| Coating | | | PLANITHERM XN |
| First glass | PLANICLEAR 6.00mm | PLANICLEAR 6.00mm | PLANICLEAR 6.00mm |
| Coating | PLANITHERM XN | | |
| Layer | | | |
| Coating | | | |
| Second glass | | | |
| Coating | | | |

### Sound transmission loss

Acoustics simulated values : **Rw(C;Ctr) = 31(-1;-4) dB**

### Manufacturing sizes

Nominal thickness : **40.0 mm**
Weight : **45.0 kg/m²**

### Luminous factors (EN410-2011) : (D65 2°)

Transmittance : **73 %**
Outdoor reflectance : **14 %**
Indoor reflectance : **14 %**

### Energy factors (EN410-2011) :

Transmittance : **45 %**
Outdoor reflectance : **30 %**
Indoor reflectance : **30 %**
Absorptance A1 : **14 %**
Absorptance A2 : **5 %**
Absorptance A3 : **5 %**

### Solar factors (EN410-2011) :

g : **0.53**
Shading coefficient : **0.61**

### Thermal transmission (EN673-2011) - 0° related to vertical position

Ug : **0.8 W/(m².K)**



Calumen II

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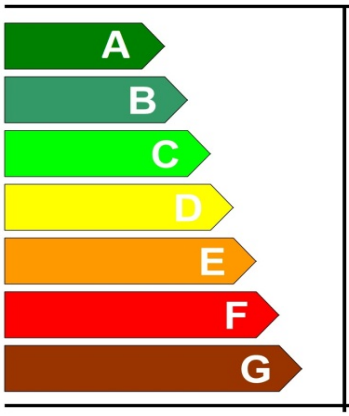
# Viking SW11 Aluclad Window

**Window Energy Rating Label:**

**Viking Window AS**
**Viking SW11 Aluclad Window**
**A-rated**




**Energy Index: 3,9 kWh/m²/year**

This is based on UK climate zone using the Approved Document L1B energy balance calculation formula:

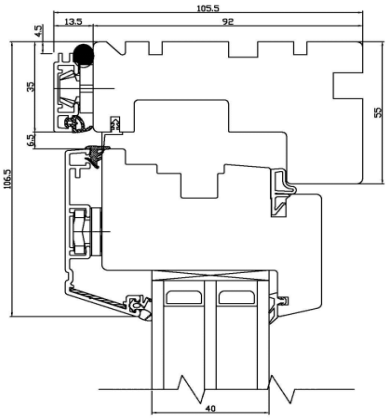
**196,7 x ((1-f) x $g_{glass}$) – 68.5 x ($U_w$ + (0,0165 x AL))**

and initial type testing data of standard window with dimensions **1230 x 1480 mm (W x H).**

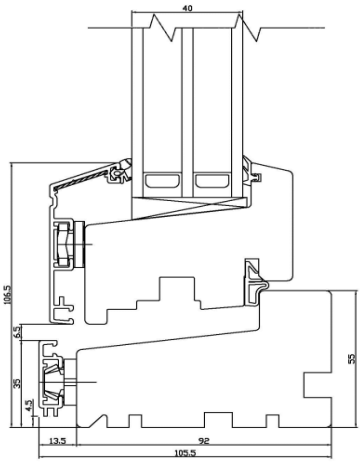
| | |
|---|---|
| **Thermal Transmittance ($U_w$)** | **0,97 W/m²K** |
| **Solar Factor ($g_{window}$)** | **0,36** |
| **Effective Air Leakage ($L_{factor}$)** | **0,00 W/m²K** |

*This label is not a certification mark. It is provided by Viking Window AS as a customer service to allow consumers to compare energy performance of competing products. The actual energy performance of any specific product depends on its size, design, installation etc.*

**Cross section of head:**




**Cross section of cill:**




**Test results according EN 14351:**

| | |
|---|---|
| **Air permeability:** | **Class 4** |
| **L (50 Pa; m³/hm²):** | **0,00** |
| **Water tightness:** | **E900** |
| **Resistance to Wind Load:** | **Class 4C** |

**Thermal properties according EN ISO 10077-2:**

| | | |
|---|---|---|
| **Uf =** | **1,39** | W/m²K * |
| **Uw =** | **0,97** | W/m²K |
| **Ψ =** | **0,043** | W/mK ** |

** Weighted average*

*** With Chromatech Ultra*

**Glazing data according EN 410:** *3k 4PlthUN-4-4PlthUN; 14/14 mm spacer 90% Argon*
*40 mm total thickness of IGU*

**Ug=** 0,64 **W/m²K**
**g=** 0,50

**Window Energy Rating according BR Approved Document L1B:**

**WER = 196,7 x ((1 - f) x g glass) - 68,5 x (Uw + (0,0165 x AL))**

**WER = 3,93 kWh/m²/year**

**WER BAND: A**

The following rating bands define the window energy rating label:

| | | | | |
|---|---|---|---|---|
| Band A | | WER | ≥ | 0 |
| Band B | 0 | > WER | ≥ | –10 |
| Band C | –10 | > WER | ≥ | –20 |
| Band D | –20 | > WER | ≥ | –30 |
| Band E | –30 | > WER | ≥ | –50 |
| Band F | –50 | > WER | ≥ | –70 |
| Band G | –70 | > WER | | |

## Calculation of thermal transmittance of standard window according EN ISO 10077-1:

| PARAMETER | VALUE | UNIT | DIMENSIONS | VALUE | UNIT |
|---|---|---|---|---|---|
| VISIBLE GLAZING AREA (Ag): | 1,29 | m² | **Height (h):** | 1,480 | m |
| U-VALUE FOR GLASS (Ug): | 0,64 | W/m²K | **Width (w):** | 1,230 | m |
| AREA OF FRAMES (Af): | 0,53 | m² | ***Profile head:*** | 0,107 | m |
| Uf: | 1,39 | W/m²K | ***Profile cill:*** | 0,107 | m |
| Linear thermal transmittance ** (Ψ) | 0,043 | W/m²K | **Ug** | 0,64 | W/m²K |
| VISIBLE GLAZING PERIMETER (Lg): | 4,568 | m | **g** | 0,50 | |
| Frame factor f: | 0,29 | | **Uw** | **0,97** | **W/m²K** |
| *** With Chromatech Ultra* | | | **g =** | **0,36** | |

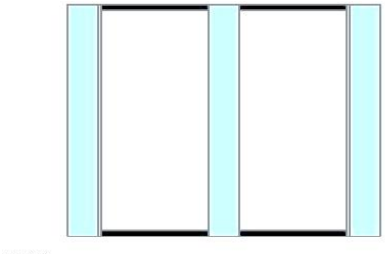
## Glazing data:

SAINT-GOBAIN GLASS

Viking

Calumen® II 1.2.4
19 February 2013
Data base : SGG Nordic

**Glazing design**




| | First glazing | Second glazing | Third glazing |
|---|---|---|---|
| Gas | | Argon 90% 14.00mm | Argon 90% 14.00mm |
| Coating | | | PLANITHERM ULTRA N |
| First glass | PLANILUX 4.00mm | PLANILUX 4.00mm | PLANILUX 4.00mm |
| Coating | PLANITHERM ULTRA N | | |
| Layer | | | |
| Coating | | | |
| Second glass | | | |
| Coating | | | |

**Manufacturing sizes**

| | | |
|---|---|---|
| Nominal thickness : | **40.0** | **mm** |
| Weight : | **30.0** | **kg/m²** |

**Luminous factors (EN410-2011) :**

| | | |
|---|---|---|
| Transmittance : | **71** | **%** |
| Outdoor reflectance : | **15** | **%** |
| Indoor reflectance : | **15** | **%** |

**Energy factors (EN410-2011) :**

| | | |
|---|---|---|
| Transmittance : | **42** | **%** |
| Outdoor reflectance : | **31** | **%** |
| Indoor reflectance : | **31** | **%** |
| Absorptance A1 : | **16** | **%** |
| Absorptance A2 : | **5** | **%** |
| Absorptance A3 : | **6** | **%** |
| Solar factor g : | **0.50** | |
| Shading coefficient : | **0.58** | |

**Thermal transmission (EN673-2011)** - 0° related to vertical position

Ug : **0.6** **W/(m².K)**

Calumen II

Indrek Rüütel
Viking Window AS
Research and Development
Mäo
72751 Estonia
Phone : +37 2 384 8900
Mobile :
Fax :
viking@viking.ee

## 10. Rooflights

Uw calculation for flat rooflight in accordance to EN ISO 10077-1:201

| Input | | | | |
|---|---|---|---|---|
| | Value | Unit | Description | decimal places |
| Width of Rooflight | 1.577 | m | | 3 |
| Length of Rooflight | 1.655 | m | | 3 |
| Height of upstand | 0.150 | m | | 3 |
| | | | | |
| Ug value of glazing | 0.900 | W/m²K | Ug for horizontal installation | 1 |
| U value of upstand | 0.380 | W/m²K | | 2 |
| Ψ value of IGU edge | -0.012 | W/mK | incl. thermal interaction to upstand | 2 |

| Results | | | | |
|---|---|---|---|---|
| | Value | Unit | Description | |
| Projected area | 2.610 | m² | excluding upstand area | |
| Upstand area | 0.970 | m² | upstand only | |
| Developed area | 3.580 | m² | including upstand area | |
| | | | | |
| Uw1, without upstand | ***0.87*** | W/m²K | referring to projected area | |
| Uw2, with upstand | ***1.01*** | W/m²K | referring to projected area | |
| Uw3, with upstand | ***0.74*** | W/m²K | referring to developed area | |
| (Results of Uw need to be rounded to 2 significant places (1.x or 0.xx)) | | | | |

Uw calculation for flat rooflight in accordance to EN ISO 10077-1:201

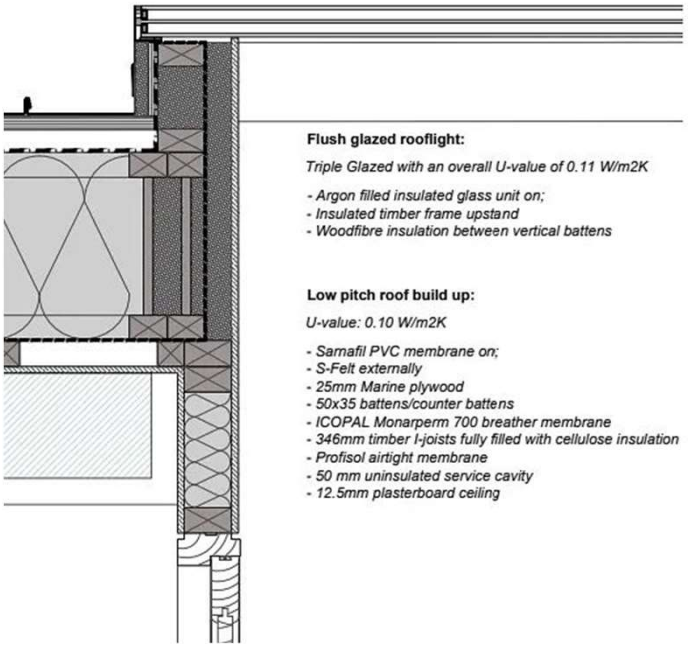
| Input | | | | |
|---|---|---|---|---|
| | Value | Unit | Description | decimal places |
| Width of Rooflight | 2.480 | m | | 3 |
| Length of Rooflight | 1.555 | m | | 3 |
| Height of upstand | 0.150 | m | | 3 |
| | | | | |
| Ug value of glazing | 0.900 | W/m²K | Ug for horizontal installation | 1 |
| U value of upstand | 0.380 | W/m²K | | 2 |
| Ψ value of IGU edge | -0.012 | W/mK | incl. thermal interaction to upstand | 2 |

| Results | | | | |
|---|---|---|---|---|
| | Value | Unit | Description | |
| Projected area | 3.856 | m² | excluding upstand area | |
| Upstand area | 1.211 | m² | upstand only | |
| Developed area | 5.067 | m² | including upstand area | |
| | | | | |
| Uw1, without upstand | ***0.87*** | W/m²K | referring to projected area | |
| Uw2, with upstand | ***0.99*** | W/m²K | referring to projected area | |
| Uw3, with upstand | ***0.76*** | W/m²K | referring to developed area | |
| (Results of Uw need to be rounded to 2 significant places (1.x or 0.xx)) | | | | |

Uw calculation for flat rooflight in accordance to EN ISO 10077-1:201

| Input | | | | |
|---|---|---|---|---|
| | Value | Unit | Description | decimal places |
| Width of Rooflight | 4.345 | m | | 3 |
| Length of Rooflight | 1.145 | m | | 3 |
| Height of upstand | 0.150 | m | | 3 |
| | | | | |
| Ug value of glazing | 0.900 | W/m²K | Ug for horizontal installation | 1 |
| U value of upstand | 0.380 | W/m²K | | 2 |
| Ψ value of IGU edge | -0.012 | W/mK | incl. thermal interaction to upstand | 2 |

| Results | | | | |
|---|---|---|---|---|
| | Value | Unit | Description | |
| Projected area | 4.975 | m² | excluding upstand area | |
| Upstand area | 1.647 | m² | upstand only | |
| Developed area | 6.622 | m² | including upstand area | |
| | | | | |
| Uw1, without upstand | ***0.87*** | W/m²K | referring to projected area | |
| Uw2, with upstand | ***1.00*** | W/m²K | referring to projected area | |
| Uw3, with upstand | ***0.75*** | W/m²K | referring to developed area | |
| (Results of Uw need to be rounded to 2 significant places (1.x or 0.xx)) | | | | |



**Flush glazed rooflight:**

*Triple Glazed with an overall U-value of 0.11 W/m2K*

*- Argon filled insulated glass unit on;*
*- Insulated timber frame upstand*
*- Woodfibre insulation between vertical battens*

**Low pitch roof build up:**

*U-value: 0.10 W/m2K*

*- Sarnafil PVC membrane on;*
*- S-Felt externally*
*- 25mm Marine plywood*
*- 50x35 battens/counter battens*
*- ICOPAL Monarperm 700 breather membrane*
*- 346mm timber I-joists fully filled with cellulose insulation*
*- Profisol airtight membrane*
*- 50 mm uninsulated service cavity*
*- 12.5mm plasterboard ceiling*

## 11. Ventilation

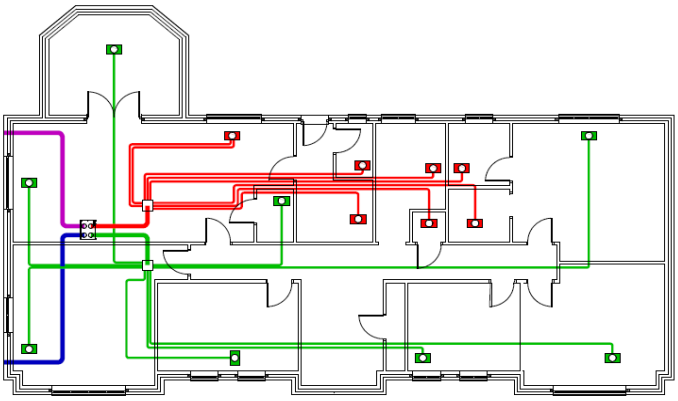
# Mechanical Ventilation with Heat Recovery

In the last few years one of the main focus points when building a property is air tightness. Optimising insulation is the key issue but that often results in poor air quality, condensation and mould.
HRV systems exchange stale air for fresh air, and recover heat in the process. This means a constant supply of fresh and filtered air and the removal of stale/damp air and pollutants, all without the heat loss associated with natural ventilation.

**Recommended Heat Recovery Ventilation Unit:** **Brink Renovent 400 1 unit**


The Brink Renovent Excellent mechanical heat recovery ventilation unit is a constant volume unit. This means that regardless of pressure drops within the ducting the unit measures its own flow and makes sure that the correct amount of air is supplied and extracted. The Renovent unit is also Passiv certified with 95% temperature efficiency. A summer bypass is built in as standard for comfortable air temperatures all year round. The unit comes complete with a digital user interface.

**WiseAir Manifold Flexible Ducting System**




**Advantages**

- Semi-Rigid flexible rolls of duct reduce the number of joints required.
- Strong crush resistant design
- Reduces crosstalk transmission and allows precise on-site commissioning
- Hygienic Construction- Designed to allow long life cleaning when required
- Reduced number of components- means less risk of failure

| **Goods Description** | |
|---|---|
| Brink Renovent 400 1 unit | |
| Ducting Components | |
| Installation & Commissioning | |
| Sub Total ex VAT | €5,130.00 |

**Kerry** Unit 2 Ardoughter, Ballyduff, Co. Kerry 066 4017028
**Cork** 22 North Point Business Park, Mallow Road, Cork 021 4308185
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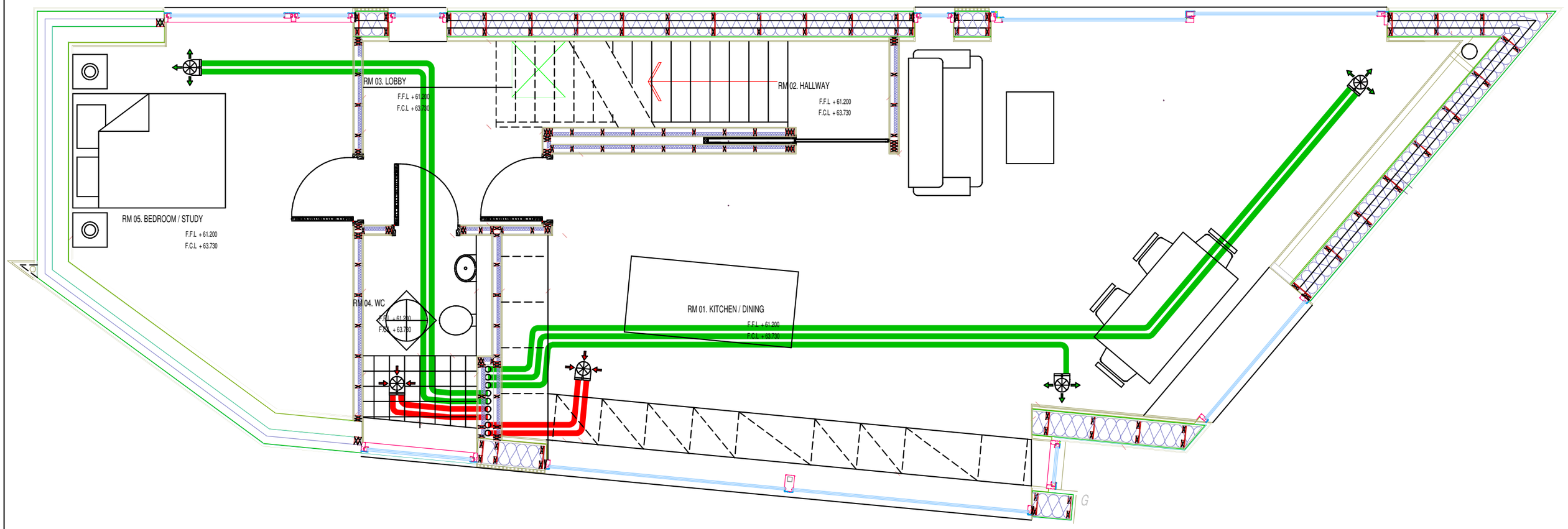


*General Notes:*
- *Based on the information supplied to Energywise Ireland all duct sizes selected will provide the best air flow performance that the building envelope allows.*
- *All duct runs will take the most direct and appropriate route unless specified otherwise.*
- *All 75mm duct needs to be within the building envlope. If not it needs to be insulated.*
- *External supply and extract vents have to be min 1.5m apart.*
- *The information is given for use with genuine WiseAir products only.*

| | |
|---|---|
| | *75mm Duct Supply Air* |
| | *75mm Duct Extract Air* |
| | *150mm Duct Supply Air* |
| | *150mm Duct Extract Air* |



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*Email: info@energywiseireland.ie*

energywise Ireland

*Client:* Mr Gareth Sullivan

*Project:* Brink HRV Unit
WiseAir Ducting System

*Project Address:* Fariways, Maryborough hill, Douglas, Cork

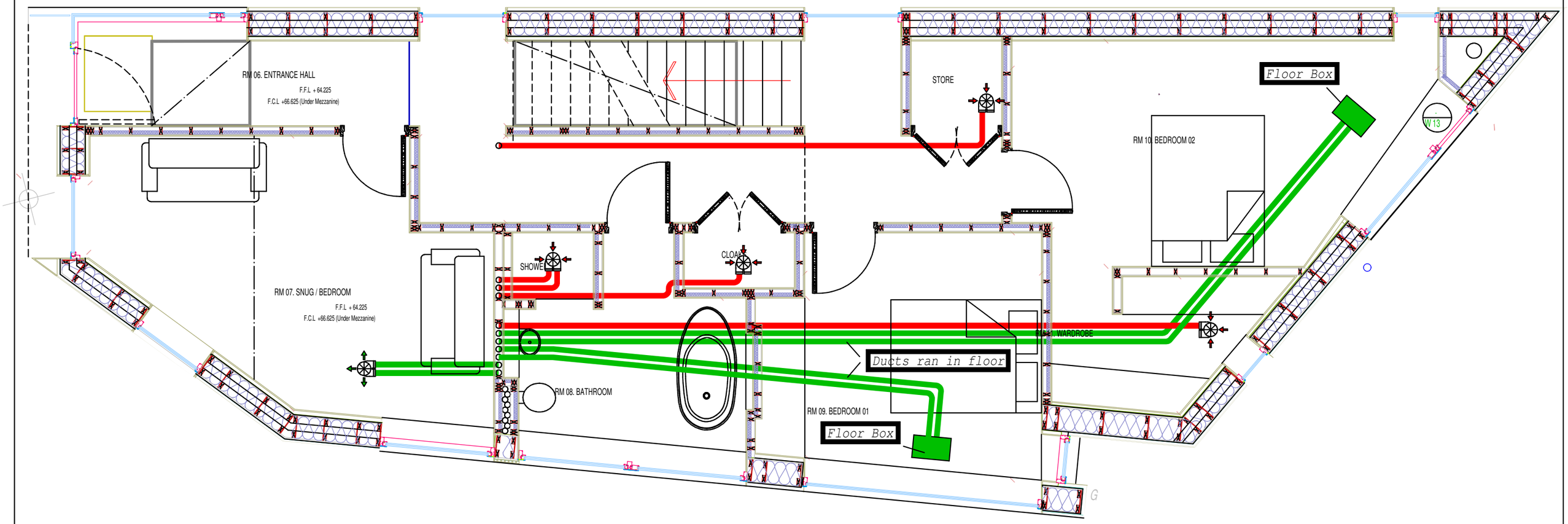
*Drawing Title:* Ground Floor - Proposed Ducting Layout

*Scale:*

*Size:* A3

*Revision:* 0

*Status:* Design Stage




*General Notes:*
- *Based on the information supplied to Energywise Ireland all duct sizes selected will provide the best air flow performance that the building envelope allows.*
- *All duct runs will take the most direct and appropriate route unless specified otherwise.*
- *All 75mm duct needs to be within the building envlope. If not it needs to be insulated.*
- *External supply and extract vents have to be min 1.5m apart.*
- *The information is given for use with genuine WiseAir products only.*

| | |
|---|---|
| | *75mm Duct Supply Air* |
| | *75mm Duct Extract Air* |
| | *150mm Duct Supply Air* |
| | *150mm Duct Extract Air* |



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*Client:* Mr Gareth Sullivan

*Project:* Brink HRV Unit
WiseAir Ducting System

*Project Address:* Fariways, Maryborough hill, Douglas, Cork

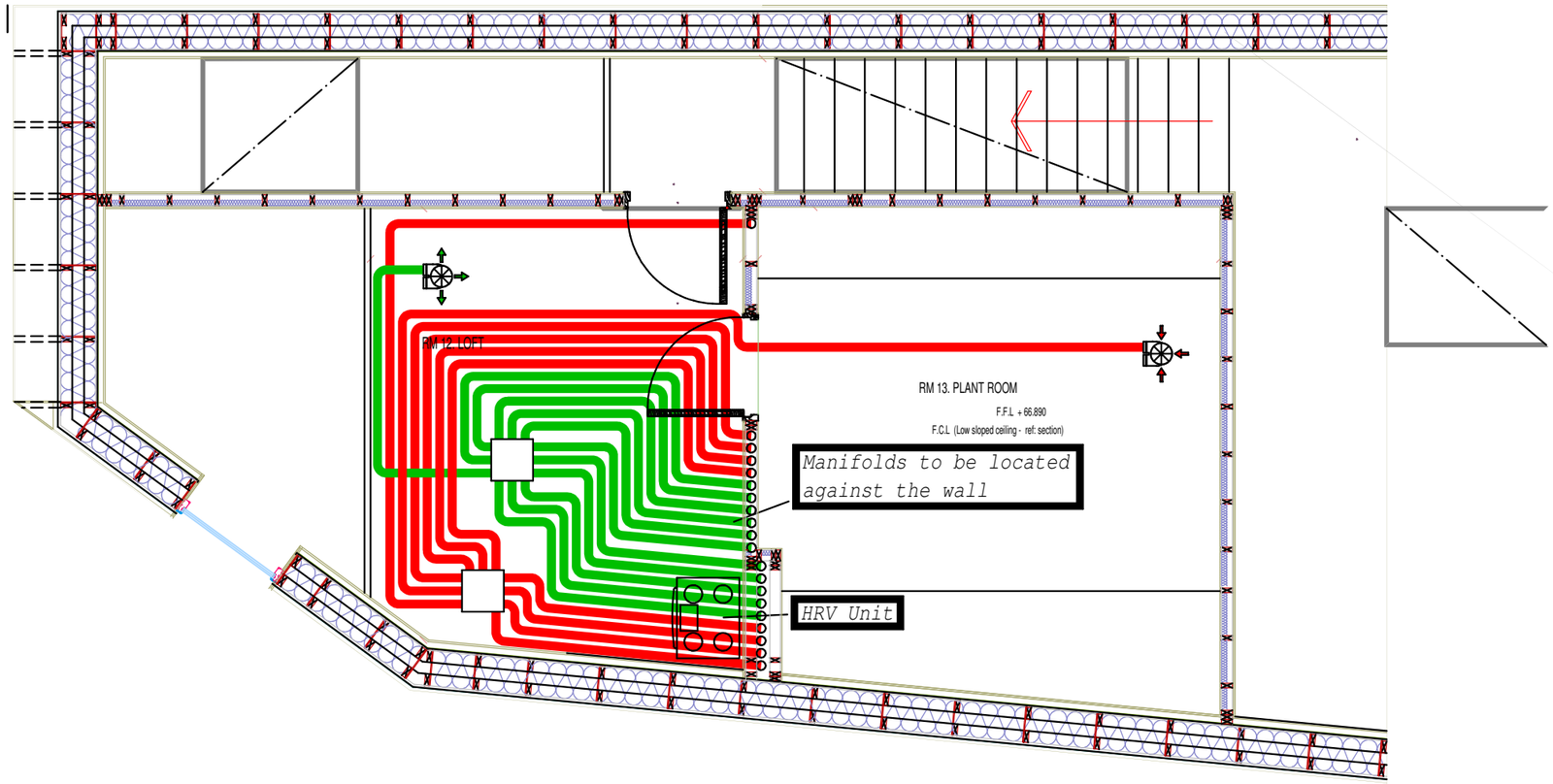
*Drawing Title:* First Floor - Proposed Ducting Layout

*Scale:*

*Size:* A3

*Revision:* 0

*Status:* Design Stage




General Notes:
- Based on the information supplied to Energywise Ireland all duct sizes selected will provide the best air flow performance that the building envelope allows.
- All duct runs will take the most direct and appropriate route unless specified otherwise.
- All 75mm duct needs to be within the building envlope. If not it needs to be insulated.
- External supply and extract vents have to be min 1.5m apart.
- The information is given for use with genuine WiseAir products only.

| | |
|---|---|
| | 75mm Duct Supply Air |
| | 75mm Duct Extract Air |
| | 150mm Duct Supply Air |
| | 150mm Duct Extract Air |



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| | |
|---|---|
| Client: Mr Gareth Sullivan | Scale: |
| Project: Brink HRV Unit<br>WiseAir Ducting System | Size: A3 |
| Project Address: Fariways, Maryborough hill, Douglas, Cork | Revision: 0 |
| Drawing Title: Second Floor - Proposed Ducting Layout | Status: Design Stage |

## 12. Heating

## Heating

### Air to Water Heat Pump

An air to water heat pump is a very energy efficient and a "green" way to heat your project and generate hot water. For every Kilowatt electrical input you will get 3-4 kilowatt in free energy from the outside air which can save up to 70% on your energy bills compared to a traditional oil boiler.

### Daikin Heat Pump Model:

### Daikin 8kW Split System complete with Integrated 260ltr cylinder

**Outdoor Unit**

- COP of up to 4.6 @ water flow temperature of 35°C
- Inverter Technology
- No Carbon Monoxide production
- Substantial savings on energy bill
- Renewable Energy from ambient air
- Split system - No antifreeze required
- Quiet operation
- Family Friendly
- 5 Year Warranty

**Indoor Unit**

**Integrated Tank**

- Integrated indoor unit: all-in-one floor standing unit including the domestic hot water tank - 260 Litre Stainless Steel
- Floor standing - neater installation than standard cylinder.
- Energy Efficient- 50% less heat loss compared to a standard tank.
- Intelligent controls offer a schedule function (heating the tank at a specified time of day) and a reheat function (automatically reheating when the temperature drops below a specified minimum.
- Built in 'A' Rated heating circulation pump.
- Built in heating expansion vessel.
- Built in safety components.

**Supply, Install and Commission of Daikin 8kW Split System complete with Integrated 260ltr cylinder indoor unit.**

| Goods Description | Cost |
|---|---|
| Daikin 8kW Split System complete with Integrated 260ltr cylinder | €7,300.00 |
| Sub Total ex VAT | €7,300.00 |

**Don't forget to provide your BER Assessor's DEAP XML file for us to assist you in meeting regulations.**

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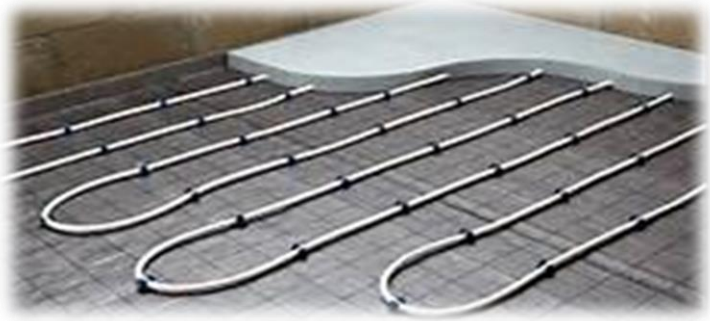
## Heating

# Underfloor Heating



Underfloor heating is a water-based heating system where a series of pipes connected to your heating system (e.g. heat pump) circulate warm water throughout the floor to heat the space. Because the heat emitted from a underfloor system is more evenly distributed than a single radiator, the system can use water at a lower temperature, making it a more efficient way of heating your home. With each main room individualy zoned, controling the temperatures in the individual rooms is easy.

**Underfloor Multilayer Pipe- Aluminium barrier wall**

Underfloor heating pipe is installed in the concrete floor screed so the quality of pipe is very important. An aluminium barriered wall pipe will stop any oxygen penetrating the pipe which protects against future corrosion of the pipes.

**Cross-linked Polyethylene (PEX)**

**Adhesive**

**StarK Aluminium Alloy**

**Adhesive**

**Crosslinked Polyethylene (PEX)**

- **100% oxygen tight**
- **Corrosion resistant**
- **Flexibility - easy to bend, light-weight and high stability**
- **Approved for pressures of up to 10 bar**
- **Excellent noise propagation properties**
- **High chemical resistance**

| Goods Description | | Cost |
|---|---|---|
| Underfloor Heating Downstairs- Supply & Install | 76 $m^2$ | €1,661.00 |
| Underfloor Heating Upstairs- Supply & Install | 71 $m^2$ | €1,551.00 |
| Sub Total | | €3,212.00 |

Price is based on 150mm pipe centres

Price accounts for no under floor heating pipes under kitchen units, utility units, shower trays etc.

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## Heating

### Aluminium Radiators


| room | Area | Heat Loss | Rad | Section |
|---|---|---|---|---|
| **Plant room** | 11.0 | 440 | Aluminium | 10 |

| | |
|---|---|
| Aluminium Radiator Adjustable Bractket | 2 |
| Aluminium Radiator Fittings (no brackets) | 1 |

Total

| **Goods Description** | |
|---|---|
| Aluminium Radiators | |
| Installation, pipe and fittings | |
| Sub Total ex VAT | €335.56 |

**Kerry** Unit 2 Ardoughter, Ballyduff, Co. Kerry 066 4017028
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## Heating

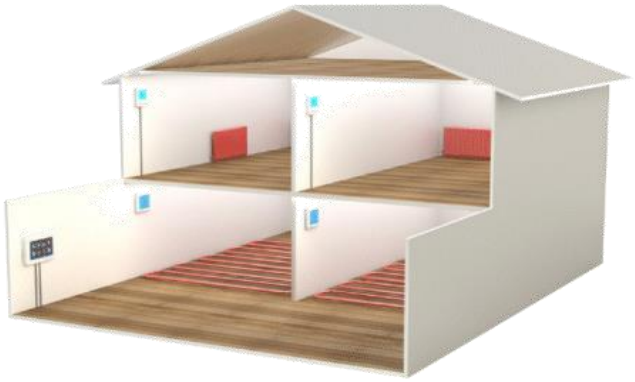
# Heating controls

Deciding on whether to have underfloor heating installed is one thing, but deciding on how you will control the system is another important decision. Let's think for a moment how it would be to have a single light switch for the entire house - it really doesn't make sense does it? However, until recently, a single heating control would have been accepted.

**Zoning the Heating System**

Underfloor heating lends itself to being zoned, dividing areas of your home into separate circuits that can be controlled differently.

A zoned system will allow you control the temperature in each individual zone ensuring only the right temperature is delivered to each room. This will improve both energy efficiency and comfort levels within the home.



## Heating Controls- Supply & Commissioning


Heatmiser 8 Zone UH3 Wiring Centre-230V

Wiring centre providing central switching, located at each underfloor heating manifold.

**Qty**

1

TM4

4 Channel digital time clock for zone time control

**Qty**

1

DS1L

Set point digital thermostat with dial control

**Qty**

5

| Goods Description | Cost |
|---|---|
| Heating Controls Pack | €310.00 |
| Sub Total | €310.00 |

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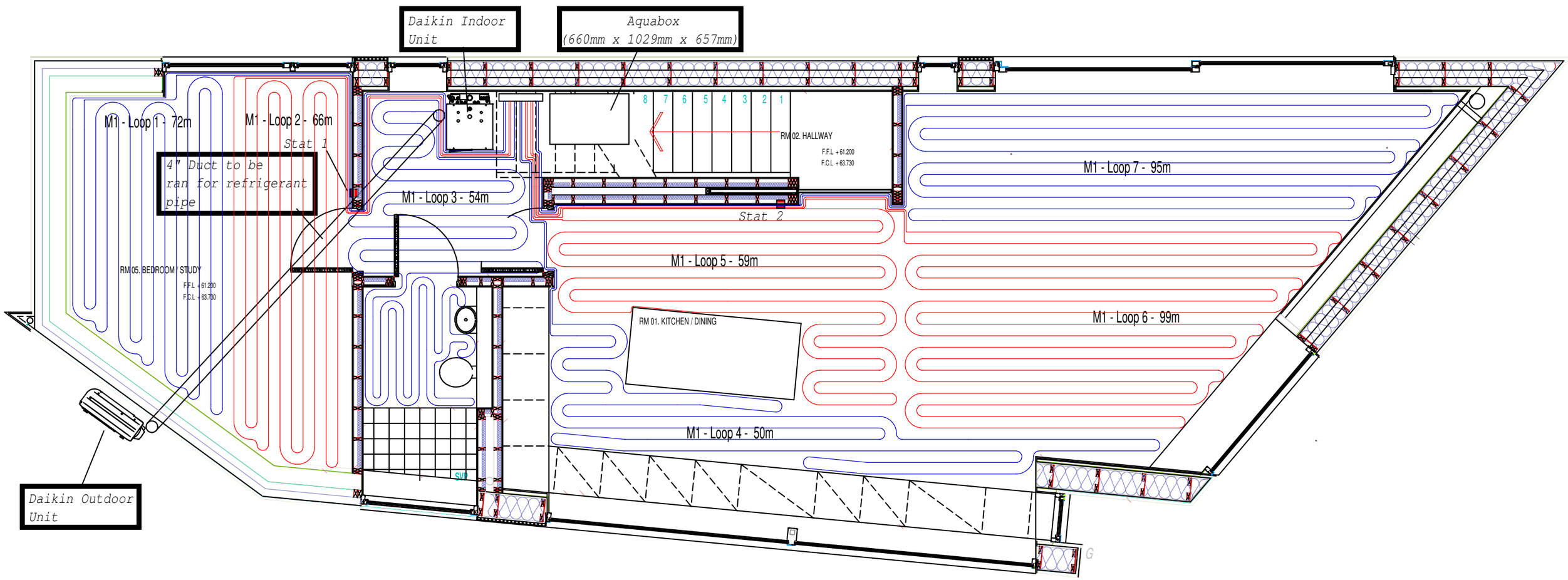
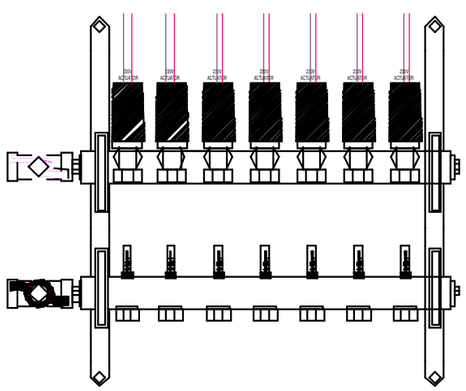



7 Port Manifold



| Under Floor Heating Legend | | | |
|---|---|---|---|
| Manifold | Loop | Length (m) | Stat |
| 1 | 1 | 72 | 1 |
| 1 | 2 | 66 | 1 |
| 1 | 3 | 54 | O/L |
| 1 | 4 | 50 | 2 |
| 1 | 5 | 59 | 2 |
| 1 | 6 | 99 | 2 |
| 1 | 7 | 95 | 2 |

*General Notes:*

- *100mm Pipe Spacing in Bathrooms*
- *150mm Pipe Spacing in all other rooms*
- *1/4" + 5/8" copper pipe between Outdoor and Indoor Units*
- *Refrigerant pipe ran through duct*
- *32mm Supply pipeto be ran from indoor unit to manifolds*
- *4" waste to be proved for indoor units*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energywise Ireland

*Client:* Gareth Sullivan

*Project:* 8KW Daikin Split System + Aquabox Energywise Ireland Underfloor Heating System

*Project Address:* Fariways, Maryborough hill, Douglas, Cork

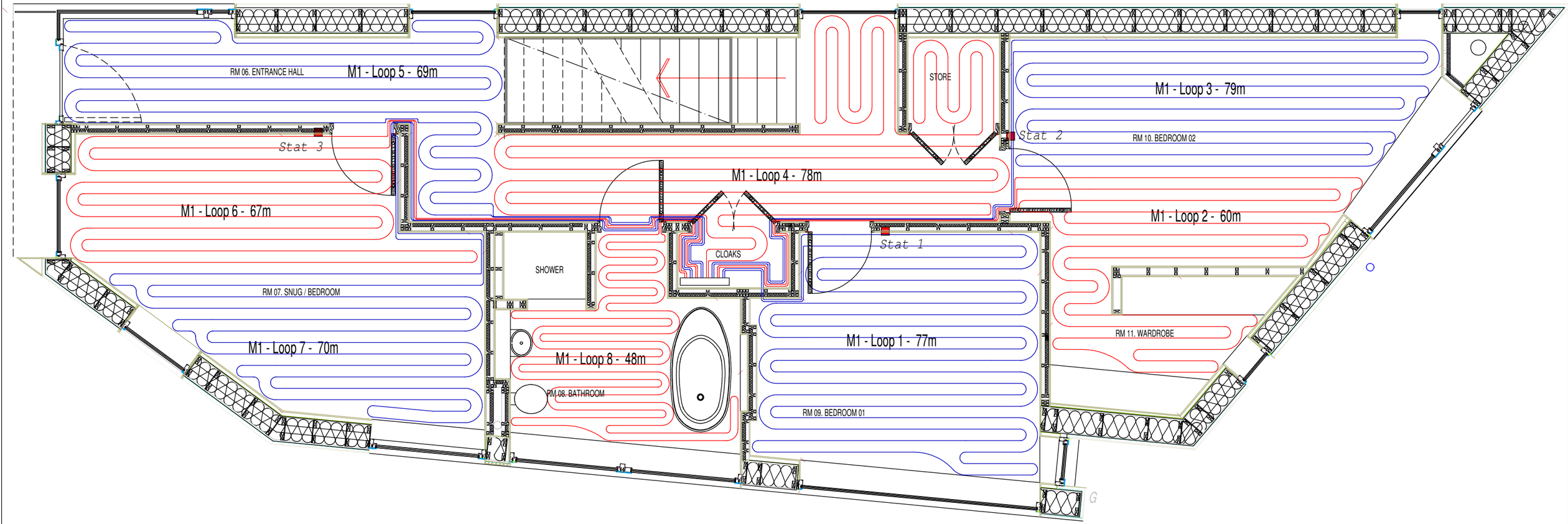
*Drawing Title:* Ground Floor - Proposed Underfloor Layout

*Scale:*

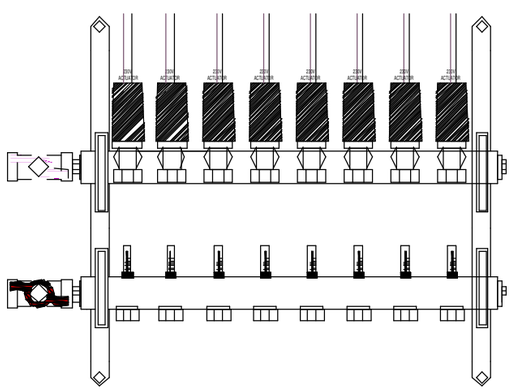
*Size:* A3

*Revision:* 0

*Status:* Design Stage




*8 Port Manifold*



| Under Floor Heating Legend | | | |
|---|---|---|---|
| Manifold | Loop | Length (m) | Stat |
| 1 | 1 | 77 | 1 |
| 1 | 2 | 60 | 2 |
| 1 | 3 | 79 | 2 |
| 1 | 4 | 78 | O/L |
| 1 | 5 | 69 | O/L |
| 1 | 6 | 67 | 3 |
| 1 | 7 | 70 | 3 |
| 1 | 8 | 48 | O/L |

*General Notes:*

- *100mm Pipe Spacing in Bathrooms*
- *150mm Pipe Spacing in all other rooms*
- *1/4" + 5/8" copper pipe between Outdoor and Indoor Units*
- *Refrigerant pipe ran through duct*
- *32mm Supply pipeto be ran from indoor unit to manifolds*
- *4" waste to be proved for indoor units*

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energywise Ireland

*Client:* Gareth Sullivan

*Project:* 8KW Daikin Split System + Aquabox Energywise Ireland Underfloor Heating System

*Project Address:* Fariways, Maryborough hill, Douglas, Cork

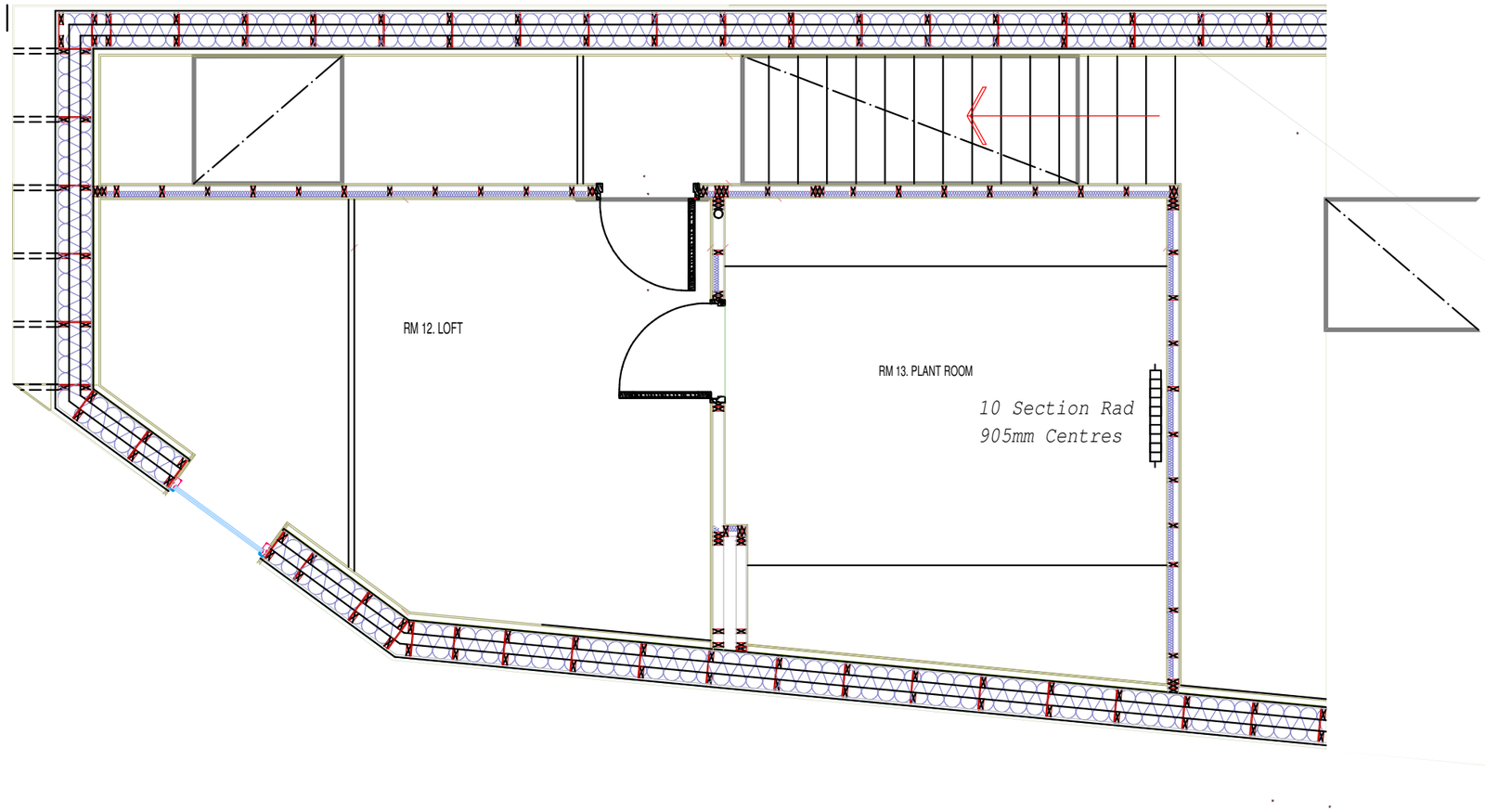
*Drawing Title:* First Floor - Proposed Underfloor Layout

*Scale:*

*Size:* A3

*Revision:* 0

*Status:* Design Stage




Energywise Ireland
22 North Point Business Park
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Phone: 021 4308185
Email: info@energywiseireland.ie

Client: Mr Gareth Sullivan

Project: Aluminium Radiators

Project Address: Fariways, Maryborough hill, Douglas, Cork

Drawing Title: Second Floor - Proposed Radiator Layout

Scale:

Size: A3

Revision: 0

Status: Design Stage

# Certificate

Certified Passive House Classic

**Earth Cycle Technologies**
**10 Springfield**
**Wicklow Town**
**Co. Wicklow**
**A67 F863**

Authorised by:

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
Germany

## Steep Wedge House
## 6 The Fairways, Maryborough Hill, T12 V04X Douglas, , Ireland

Certified Passive House
Passive House Institute
| classic | plus | premium |

| | |
|---|---|
| Client | Gareth & Barbara Sullivan<br>6 The Fairways, Maryborough Hill<br>T12 V04X Douglas,, Ireland |
| Architect | Simply Architecture<br>18A Washington Street<br>T12 A3VC Cork , Ireland |
| Building Services | Energywise Ireland<br>Unit 6, North Point Business Park, New Mallow Rd.<br>T23 H227 Cork, Ireland |
| Energy Consultant | Evan Finnegan<br>Lane Business Park, Monahan Road<br>T12 VK2Y Cork, Ireland |

Passive House buildings offer excellent thermal comfort and very good air quality all year round. Due to their high energy efficiency, energy costs as well as greenhouse gas emissions are extremely low.

**The design of the above-mentioned building meets the criteria defined by the Passive House Institute for the 'Passive House Classic' standard:**

| Building quality | | This building | | Criteria | Alternative criteria |
|---|---|---|---|---|---|
| **Heating** | | | | | |
| Heating demand | [kWh/(m²a)] | 22 | ≤ | 15 | - |
| Heating load | [W/m²] | 10 | ≤ | - | 10 |
| **Cooling** | | | | | |
| Frequency of overheating (> 25 °C) | [%] | 6 | ≤ | 10 | |
| **Airtightness** | | | | | |
| Pressurization test result ($n_{50}$) | [1/h] | 0.6 | ≤ | 0.6 | |
| **Non-renewable primary energy (PE)** | | | | | |
| PE demand | [kWh/(m²a)] | 60 | ≤ | 105 | |

The associated certification booklet contains more characteristic values for this building.

Certified: Robert Ryan, Earth Cycle Technologies