# **Project Documentation Gebäude-Dokumentation**

# Abstract | Zusammenfassung





# Two Storey Detached single family house

## Data of building | Gebäudedaten

Year of construction Baujahr	2018	Space heating	15	
U-value external wall	0,124	Heizwärmebedarf	∎ 🥭 kWh/(m²a)	
U-Wert Außenwand	W/(m²K)			
U-value basement	0,086	Primary Energy Renewable (PER)		
U-Wert Kellerdecke	W/(m²K)	Erneuerbare Primärenergie (PER)	kWh/(m²a)	
U-value roof	0,108	Generation of renewable Energy		
U-Wert Dach	W/(m²K)	Erzeugung erneuerb. Energie	kWh/(m²a)	
U-value window	0,78	Non-renewable Primary Energy (PE)	81	
U-Wert Fenster	W/(m²K)	Nicht erneuerbare Primärenergie (PE)	kWh/(m²a)	
Heat recovery Wärmerückgewinnung	81 %	Pressurization test n <sub>50</sub> Drucktest n <sub>50</sub>	0,5 h <sup>-1</sup>	
Special features Besonderheiten				

#### Passive House Craigavon – ID 5830

This modest house came about as a result of our client wanting a certified Passive house to that particular standard and also within a fixed budget. The house was designed as a simple form, two storey for envelope energy efficiency and with large amounts of glazing to the southwest side of the house. These spaces are also the main living spaces and fortunately offer the best view from the site.

The house has all of the necessary attributes of a passive house. These features include triple glazing, super insulated, heat recovery and ventilation and very low airtightness. The house will not have a conventional central heating system as it is anticipated that the peak space heating demand will be in the order of 3kw for the entire house. The house would therefore be comfortably heated, during very colder weather, with two small 5kw wood burning stove located in the open plan living space. The reason why a conventional heating system is not necessary is that the ventilation system will transfer a calculated amount of heat throughout the house with smaller rooms needing no additional heat source due to the delivered temperature of the warm air.

The house has been analysed by imputing relevant data into the Passive House PHPP software. This software essentially measures the energy efficiency of the envelope and allows for 'passive' heat gains such as south facing glazing, heat recovered from the ventilation system and the heat given off by the day-to-day usage of the house. This software and its application is performance based with the combined envelope efficiency and passive heating elements of the design combining to create a building that has a heat loss of only 15kw/m2/a.

In this instance the client has opted to have the house fully certified by the German Passive House institute. This costs a little extra in terms of professional fees but means that the house will have a quality approved certificate issued by the Passive House Institute in Germany. It is suggested that this seal of approval in terms of the energy efficiently of the house should positively affect the resale value of the house making the extra capital cost of the project an investment in the future. The house will also have considerably lower the Co2 emissions than conventional houses. Energy efficiency is therefore a large factor in building sustainably.

#### Responsible project participants Verantwortliche Projektbeteiligte

Architect	Paul McAlister Architects Ltd
Entwurfsverfasser	
The share station share to a	
Implementation planning	Paul Michlister Architects Ltd
Austunrungsplanung	
Building systems	Daul McAlistor Architocts Ltd
Haustochnik	
Haustechnik	
Structural engineering	
Baustatik	George Dawson Ltd
bustatik	
Duilding a shusing	
Building physics	Paul Michlister Architects Ltd
ваирпузік	
Passive House project planning	Paul McAlister Architects Ltd
Passivhaus-Projektierung	
Construction management	
Bauleitung	Paul McAlister Architects Ltd
battertung	
Certifving body	
Zertifizierungsstelle	

Earth Cycle Technologies (ECT) & Passivhaus Institut Darmstadt

#### **Certification ID Zertifizierungs ID**

E920	Project-ID ( <u>www.passivehouse-database.org</u> )
5050	Projekt-ID (www.passivhausprojekte.de)

## Author of project documentation Verfasser der Gebäude-Dokumentation

Paul McAlister

Date Datum Signature Unterschrift

11-05-2022

Tan M. Ghite.

## 1. Ansichtsfotos - Photos



2. Innenfoto exemplarisch - Interior



## 3. Schnittzeichnung / Section



4. Grundrisse / Floor Plans



#### 5. Konstruktion der Bodenplatte – Floor Slab



In order to keep the construction-related thermal bridge low, the base of wall is finished aerated concrete block.

Assembly no.						Interior insulation?
03ud	Floor					
		Heat transmission resista	nce [m²K/W]		7	
Orientation of building element	3-Floor	interior R <sub>si</sub>	0.17			
Adjacent to	2-Ground	exterior R <sub>se</sub> :	0.00			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Screed	1.600					75
Kingspan TF70	0.022					250
Concrete Subfiloor	2.100			2		225
			8 (1			
		2	(i.			
Perc	entage of sec. 1 100%	Percent	age of sec. 2	Pe	ercentage of sec. 3	Total <b>55.0</b> cm
U-value supplement		W/(m²K)		U-va	lue: 0.086 W	/(m²K)

## 6. Konstruktion der Außenwände – Outer Walls



A Cavity wall construction – 100mm blockwork with 250mm cavity (full fill insulation) with 100mm inner leaf.

Assembly no.						Interior insulation?
02ud	Wall					
		Heat transmission resistar	nce [m²K/W]			<u></u>
Orientation of building elen	nent 2-Wall	interior R <sub>si</sub>	0.13			
Adjacer	nt to 1-Outdoor air	exterior R <sub>se</sub> :	0.04			
Anna an tion d	) [[A///mK]]			Arra anation 2 (antional)	3 []M//(mK)]	Thiskess from 1
Internal Plaster	0.600	Area section 2 (optional)	× [w/(nix)]	Area section 3 (optional)	. [w/(mx)]	
Block	1 230			1		215
Bead	0.033					250
Block	1.230					100
Render	0.800					18
			C			
F	Percentage of sec. 1 100%	Percenta	age of sec. 2	Perc	entage of sec. 3	Total 60.1 cm
U-value supplen	nent	W/(m²K)		U-valu	e: 0.124 w	/(m²K)

#### 7. Konstruktion des Daches / Roof



Roof is a tradtional timber cut roof.

Insulation is 125mm PIR insulation on top with 150mm PIR Insulation between rafters.

Roof Else Where Heat transmission resist			
Heat transmission resist	C-BERRIT		
	ance [mm//w]		- 65 - 59
1-Roof interior R	0.10		
3-Ventilated exterior R <sub>a</sub>	0.10		
\[W/(mK)] Area section 2 (optional)     \]	λ [W/(mK)] Area section	13 (optional)	(K)] Thickness [mm]
0.022			125
0.022	0.130		150
			- S
ntage of sec. 1 Percer	tage of sec. 2	Percentage of se	sc. 3 Total
93%	7.3%		27.5
		172	
3	Ventilated     exterior R <sub>a</sub> \[W/(mK)]]         Area section 2 (optional)            0.022          0.022             0.022           0.02             0.022           0.02             0.022           0.02             0.022           0.02             0.022           0.02             0.022           0.02             0.022           0.02             0.022           0.02             0.022           0.02             0.022           0.02             0.022           0.02             0.022           0.02             0.022           0.02             0.022             0.022           0.02             0.022           0.02	Ventilated         c. 1.0           λ [W/(mK)]         Area section 2 (optional)         λ [W/(mK)]         Area section           0.022         0.130         0.130         0.130           0.022         0.130         0.130         0.130           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1           1         1         1         1 <td>Ventilated         0.10           λ [W/(mK)]         Area section 2 (optional)         λ [W/(mK)]         Area section 3 (optional)         λ [W/(mK)]           0.022         0.130         0</td>	Ventilated         0.10           λ [W/(mK)]         Area section 2 (optional)         λ [W/(mK)]         Area section 3 (optional)         λ [W/(mK)]           0.022         0.130         0

#### 8. Fenster und Fenster-Einbau – Window Installation



Beschreibung der Fenster (rahmen)-Konstruktion, Hersteller	Munster Joinery / Baskil Windows
Fabrikat Fenster (rahmen; Produktname)	PassiV Future Proof Component-ID: 0064wi03
Rahmen-U-Wert Uf	0,78 W/(m²K)
Bauart der Verglasung	Outside opening plastic window frame, chambers partly filled with PU-foam (0.030 W/(mK)); Glazing: 4/20/4/20/4
Glas-U-Wert Ug	0,70 W/(m²K)
g-Wert der Verglasung	0,70

## 9. Beschreibung der luftdichten Hülle – Air Tight Envelope

The first pressure test was carried out after the completion of the airtight shell.



#### Summary

5 animar y			
<b>retroitec</b> FanTestic	version: 5.10.6	58	licensed to: ATS Surveys
Test date: 2018-11-28	By: Leo Carr		1
Customer:	Peter & Helen	Richardson	
Building Lot Number:			
Building address:	29 Dunkirk Rd Waringstown, N Ireland	, Co Down	
		22	
Building and Test Information	on		
Test file name:		29 Dunkirk R	td Pressurize
Building volume [m <sup>3</sup> ]:		708	
Envelope Area [m <sup>2</sup> ]:		717	
Floor Area [m <sup>2</sup> ]:		155	
Building Height (from ground	d to top) [m]:	5.5	
Results			
Air flow at 50 Pa, Q <sub>50</sub> [m <sup>3</sup> /h]		309.80	

0.44 79.90 0.432

Summary			
<b>retroitec</b> FanTestic	version: <b>5.10.6</b>	58	licensed to: ATS Surveys
Test date: 2018-11-28	By: Leo Carr		1
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Envelope Area [m <sup>2</sup> ]:		717	
Floor Area [m <sup>2</sup> ]:		155	
Building Height (from ground	d to top) [m]:	5.5	
Results			
Air flow at 50 Pa, Q <sub>50</sub> [m <sup>3</sup> /h]		364.00	
Air changes, n <sub>50</sub>		0.51	
Equivalent leakage area at 5	0 Pa [cm <sup>2</sup> ]	32.95	
Permeability at 50 Pa [m3/h/	'm²]	0.508	

#### Air tightness concept

Walls: interior plaster

Air changes, n<sub>50</sub> Equivalent leakage area at 50 Pa [cm<sup>2</sup>]

Permeability at 50 Pa [m<sup>3</sup>/h/m<sup>2</sup>]

Floor plate: concrete

Connection window: with plaster end rail + adhesion preventer + acrylic joint Roof: sheet of foil Plaster-foil connection: plastered expanded metal

## 10. Lüftungsgerät / Ventilation Unit

The ventilation unit is fitted with highly efficient counter-flow heat exchangers which are optimised to a very high efficiency level thus achieving a very low specific fan power (SPI value) for the entire unit.

Fabrikat Lüftungsanl age	Dantherm
effektiver Wärmeberei tstellungsgr ad	81.6 %
Elektroeffizi enz	0,26 Wh/m³



#### 11. Lüftungsplanung Kanalnetz / Duct Layouts



#### 12. Wärmeversorgung / Heat Supply

#### Hot Water

The ESP Ecocent units are industry leading, innovative hot water supply systems which use a built-in Air Source Heat Pump to scavenge waste heat from the MVHR and make domestic hot water heating highly efficient offering a saving of up 75%. This system hold 300l of hot water.

#### **Room Heating**

The house is fitted with two wood burning stoves and a number of small electric radiators located in the bathrooms and ensuites.



#### 13. Baukosten – Building Costs

The pure construction costs amounted to 1384 £/m<sup>2</sup>

#### 14. Literatur

## **15. PHPP-Ergebnisse – PHPP Results**

	iouse .							
				Buildin	29 Dunkirk F	Road		
				Street	29 Dunkirk F	Road,		
				Postcode/Cit	BT66 7SW	Waringstown,		
			-	Province/Countr	Armagh NI	1	G8-United Kingd	om/Britain
				Building typ	Single Famil	ly Residence		
	- Aller			Climate data se	t GB0022a-Be	Ifast-Aldergrove	6	
			THE 1 MILL	Climate zon	e: 3: Cool-temp	perate Attitud	de of location:	50 m
	and the second			Home owner / Clien	t: Peter and He	elen Richardson	-	
			CALCULATION OF THE OWNER	Stree	t 29 Dunkirk F	Road.		
8				Postcode/Cit	BT66 7SW	Waringstown,		
				Province/Countr	y: Armagh NI	1	GB-United Kingd	om/Britain
Architecture	David Medilator	Architecte I td.		Machanical engines	Paul Medile	or Architecte I to		
Architecture.	The Barn Studie	Architects Lto	mai Boad	Street Street	The Bern St	ier Architects Lto	acamor Road	
DestendalCity	BTE3 SLY	Dortadown	nvy noau	DovicorialCi	RT63 6LV	Portadown	acanvy Roau	
Province/Crowtry	Co Armagh	GB	United Kinodom/ Britain	Province/Countr	Co Armanh	Portadown	GB-United Kinod	om/Britain
Province country		00	Contra tongate in antiant	Fromisercourie	y. oo rannight	1		
Energy consultancy:	Paul McAlister	Architects Ltd		Certification	n: Earth Cycle	Technologies		
Street	The Barn Studie	o, 64A Drumnacar	nvy Road	Stree	t: 10 Springfie	ld		
Postcode/City	BT63 SLY	Portadown		Postcode/Cit	y: A67F863	L		
Province/Country.	Co Armagh,	GB-	-United Kingdom/ Britain	Province/Countr	y: Ireland		).	
Year of construction:	2019			Interior temperature winter ["C	3 20.0	Interior temp. s	ummer [*C]:	25.0
No. of dwelling units:	11		Internal heat	t gains (IHG) heating case IW/m	1: 2.3	IHG cooling of	case [W/m <sup>2</sup> ]:	2.3
							The set of a set for one	
No. of occupants	istics with reference Trea	ce to the treated floor area m <sup>2</sup>	or area	ecific capacity [Wh/K per m <sup>a</sup> TFA The PHPP	has not been	filled completely; Alternative criteria	it is not valid	as verifica
No. of occupants	ristics with reference Trea He	ce to the treated flo ated floor area m <sup>2</sup> eating demand kW	Sp or area /h/(m²a) 203.0	ecific capacity [Wh/K per m* TF# The PHPP 5	has not been Criteria 15	Mechan filled completely; Alternative criteria	it is not valid	Fullfilled
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No. of occupants: secific building character pace heating pace cooling Frequency of exce intightness on-renewable Primary rimary Energy enewable (PER)	3.1 ristics with reference Trea He Cooling & de squency of overhes essively high humic Pressurization Pressurization Pressurization energy (PE) Generation energy (in r jected building given herein have 1 e PHPP calculation F	ce to the treated flo rated floor area m <sup>2</sup> eating demand kW Heating load W/r ehum, demand kW Cooling load W/r ating (> 25 °C) % dity (> 12 g/kg) % I test result n <sub>50</sub> 1/h PE demand kW PER demand kW PER demand kW nof renewable relation to pro- kW footprint area)	Sp           or area           10/(m*a)           15           m*           13           14/(m*a)           -           0           0           0           0           0           0.5           15/(m*a)           16/(m*a)           95           1b/(m*a)           95           ollowing the PHPP methis verification.           rat name.	The PHPP	204 has not been Criteris 15	Mechan filled completely; Alternative criteria 10 - 10 - - - - - Passive House	it is not valid	as verifica Fullfilled yes yes yes yes yes yes yes sign
No. of occupants: pecific building character pace heating pace cooling Free Frequency of exce irtightness on-renewable Primary rimary Energy enewable (PER)	3.1 ristics with reference Trea He Cooling & de squency of overhes essively high humic Pressurization Pressurization Pressurization Energy (PE) Generation energy (in r jected building given herein have 1 e PHPP calculation F	ce to the treated flo atted floor area m <sup>2</sup> eating demand kW Heating load W/r ehum, demand kW Cooling load W/r ating (> 25 °C) % dity (> 12 g/kg) % t test result n <sub>50</sub> 1/h PE demand kW PER demand kW PER demand kW nof renewable relation to pro- kW footprint area)	Sp           or area           th/(m*a)           15           m*           13           th/(m*a)           -           0           0           0           0           0           15           m*           0           0           0           0           0           0           0           0           0           0           0           0           0           0           0           0           0           0           10(m*a)           95           10(m*a)           -           oth/(m*a)           -	The PHPP	204 has not been Criteris 15	Mechan filled completely: Alternative criteria 10 - 10 - - - - - - Passive House	it is not valid	as verifica Fullfilled yes yes yes yes yes yes signa