



Passive House Academy

# Passive House Certification

Guidance Document



## Why work with Passive House Academy?

- **Internationally accredited by the Passivhaus Institut** to certify Passive House projects Internationally
- **Leading experts** in the Passive House standard, working on projects since 2002
- Currently working on over **60 Certification projects** in the US
- Dedicated Certification team of **8 experienced Consultants**
- Staff are very **experienced in PHPP software** – the essential passive house design tool as well as with **Therm calculations** for thermal bridges
- PHA is a leading training provider for both designers and tradespersons in the US and has extensive experience in dealing with a **broad range of construction types and climates**
- **Proactive and solutions-focused** approach with the aim of providing a timely and efficient service to our Clients
- **Certifiers of numerous award winning Passive House projects** including Julie Torres Moskovitz's 'Tighthouse' in Brooklyn and Onion Flats' 'Belfield Homes' project in Philadelphia.
- Certifiers of several **'EnerPHit' projects** (the Passive House deep retrofit standard).



## Why Certify your Passive House Project?

- Certification process typically ensures a **cost-optimal design** approach delivering the best return on investment
- **Quality assurance** for the client;
- **Proof of evidence** of reaching the International standard;
- **Listing** on the international database of Certified projects;
- Distinction in the marketplace, record of achievement and **stamp of approval**;
- Access to increased **marketing opportunities** (Editors are more open to featuring projects that have been certified); and
- **Learning opportunity** for the Project Architect resulting from participation in the process.



# Documentation Required for a Passive House Quality Approval Certificate

## Please note:

To submit an information package or an enquiry about Certification please email Alan at [alan@passivehouseacademy.com](mailto:alan@passivehouseacademy.com). We only accept information on your project by digital download link. We do not accept hard copy or CD packages or live shared folders.


## 1) Minimum Documentation Required for Commencement of Certification

### 1.1) A Complete PHPP File Containing at least the following Calculations:

- Verification
- Areas
- R-values
- Windows
- WinType
- Ground
- Shading
- Ventilation
- Annual Heating Demand
- Monthly Method
- Heating Load
- Summer, Shading-S, SummVent
- DHW+Distribution
- SolarDHW
- Annual heat generator utilisation factor
- Compact, Boiler or District Heat
- Electricity demand
- Electricity
- Auxiliary electricity demand
- Aux Electricity
- Primary energy
- PE Value
- Climate data

Passive House Planning  
REDUCTION FACTOR SOLAR RADIATION, WINDOW U-VALUE

Passive House Planning  
AREA CALCULATION

- 
- 1.2)** A site plan or sketch showing the heights of immediately surrounding buildings and trees. The sketch or drawing should display the measured distance from the facade of the building to each shading object and also an approximate height from floor level to the shading object.
  - 1.3)** An auto-cad Dxf/Dwg of plans, elevations & sections for the proposed design. The edge of frame dimensions should be clearly shown for all windows (in dashed under overlap of insulation if any). If there are multiple assemblies intended for different areas of the elevations this should be clearly shown in coloured hatch or highlighting.
  - 1.4)** Photographs facing every direction, with the orientation clearly labelled and depicting all shading objects surrounding the project.
  - 1.5)** A Google Map link with the exact project location

#### **1.6) Proposed Construction Details**


A detail of every junction in the thermal envelope should be submitted. If the construction build-ups of all opaque elements (walls, roofs and floors) are not clearly shown on these then a sketch/drawing should be submitted of all assemblies (PHPP calculations alone will not suffice). Both construction details and assembly sketches must show:

- The thickness of all layers;
- The insulation type, including conductivities or R per inch of all materials in the assembly/detail (products technical specifications must be submitted in accordance with item 2.2);
- The centers and thicknesses of any repeating elements (ie, timber studs or steel studs); **and**
- The gauge of steel studs (if used).

### **2) Additional Documentation for Advancing Certification**

#### **2.1) Technical Information for Insulation Products**

- Technical Brochures for all insulation products must be provided stating thermal conductivities (R per inch) in accordance with local government standards;

- 
- This can any local government testing. The Construction Supervisor is liable for the performance of the materials so if materials are rated with dubious values caution must be taken.
  - Be sure to highlight the specific insulation values that pertain to the product you have chosen.

## **2.2) Glass Technical Information**

**2.2.1)**  $U_g$  or  $R_g$  according to ISO EN 673

**2.2.2)** Solar heat gain coefficient (SHGC) or 'g-value' according to ISO EN 410

**2.2.3)** Psi glass edge according to ISO EN 10077-2

## **2.3) Window Frame Glazed Door or Solid Door Technical Information**


**2.3.1)**  $U_f$  or  $R_f$  according to ISO EN 10077-2

**2.3.2)** Widths of frames for top, bottom and sides

## **2.4) Technical Information for the Ventilation Unit**

- We highly recommend the use of a Passivhaus Institut (PHI) certified ERV (energy recovery ventilator) or HRV (heat recovery ventilator) as, leaks and thermal bridges in non-certified units can drastically affect their efficiency. The type (ERV or HRV?) and certification for the proposed ventilation unit is needed. If you choose not to use a PHI certified unit, we are required to reduce the manufacturers stated efficiency by 12%.
- The designed air flow rate has a significant effect on the energy balance of Passive House buildings. Air flow rates must be designed so that a minimum of 0.3 air changes per hour is achieved. In climates with cold winters, it is important not to greatly exceed the 0.3 air changes per hour in order to avoid low internal air humidity.





**2.4.1)** For certification we need a simple sketch (if drawings are already created, please send them) of the proposed supply and extract points, the position of the ERV / HRV and the intended flow rates at all registers.

**2.4.2)** Passive House certificate/technical Information stating both heat recovery and electrical efficiency.

**2.4.3)** Length of ambient air ducts (those that connect to the outside world) as well as proposed insulation type, thickness and R per inch thereon .

## **2.5) Subsoil Heat Exchanger**

In extremely cold climates a subsoil heat exchanger is a viable source of frost protection and pre-tempering.

Subsoil heat exchangers can be extremely problematic if not constructed properly or if the condensate drain dries out. It is imperative that if such a system is used that a specialist contractor is used.

A liquid source solution such as brine/glycol is much less problematic and can work very well with common systems.

For either system a layout showing the underground piping is needed. Although useful for frost protection and some tempering of the air it will only improve the ERV / HRV efficiency by approximately 4%. With liquid systems this energy saving may be outweighed by the electrical consumption of the circulation pumps.

## **2.6) Primary Energy – Heating, Cooling and Hot Water Production Description**

We need a brief description of the proposed heating, cooling and hot water systems. The use of efficient heating, cooling and hot water systems is crucial and contributes to a large proportion of the energy use in a Passive House building. If solar thermal collectors are used in combination with an efficient heating, cooling and hot water system then the primary energy target can usually be easily met. The use of direct electricity is not recommended and will cause the primary energy target to be exceeded in most cases (heat pumps, mini-splits are typically acceptable).

For the Pre-Certification we need an outline description of how you intend to produce hot water and deal with the heating and cooling demands.

## **2.7) Technical Brochures stating Efficiencies of Mechanical Equipment (heating, cooling and domestic hot water)**

For heating furnaces/boilers we simply need a technical document stating the efficiency. For Heat Pumps we need the coefficient of performance (COP) and season energy efficiency ratio (SEER), the capacity and the flow rates of each indoor cassette and wall unit for both heating and cooling modes.

If you are using a heat pump hot water heater we need the COP or SEER and for the storage tank the losses in W/K or BTU/hr.F.

## **2.8) Hot Water and Heating Supply Pipelines Layout**

For all hot water pipes we will need a dimensioned layout or sketch showing dimensions, diameter and thickness and type of insulation and details of the circulation loop (if used). The location of the tank and heat generator should also be shown.

## **3) Additional Documentation for Certification of Schools and Offices**

- 3.1)** A usage profile indicating the occupancy times and frequencies of absenteeism for all spaces within the building.
- 3.2)** A lighting layout with a legend indicating the wattage of each fixture.
- 3.3)** An equipment and appliance schedule with the power consumption of all electronic devices.

### **Additional Documentation**

Additional documentation will be requested depending on special circumstances and building types. Items such as external sliding doors, elevators, extract exhausts for dryers and other special items like thermal bridging of details may be sought. At the end of the review all such special information will be listed.

## **4 Verifications and Declarations**

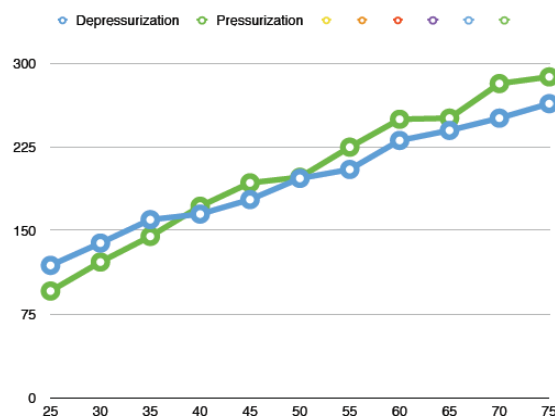
### **4.1 Verification of the airtight building envelope in accordance with EN ISO 13829\*** ***\*This standard is currently under review, please check prior to commencement***

In addition to what is specified in EN ISO 13829\*, a series of air tightness measurements for **both positive and negative pressure** is necessary for Passive House projects (see image below). The pressure tests are to be carried out only for the heated building



envelope (basements, porches and conservatories etc. that are not integrated into the thermal envelope should not be included in the test). It is recommended that the test be carried out when the airtight layer is still accessible so that improvements can still be made if necessary. The indoor air volume calculation should also be documented in the pressure test report. The pressure test is to be carried out by an **institution or person independent of the contractor** or building owner. Pressure tests conducted by the contractor will only be accepted if an individual who is fully responsible for checking the accuracy of the information provided in the test results signs off on them.

Depressurization		Pressurization	
Pa	CFM	Pa	CFM
25	119	25	96
30	139	30	122
35	160	35	145
40	165	40	172
45	178	45	193
50	197	50	198
55	205	55	225
60	231	60	250
65	240	65	251
70	251	70	182
75	263	75	288



## 4.2 Documenting Flow Rate Adjustment (Balancing the Ventilation System)

In Cell I67 in the PHPP “Ventilation” sheet the maximum design air flow rate is specified. However, when balancing the ventilation system, this must be done at the standard rate (typically 77% of the maximum rate), specified in Cell I68 in the same sheet.

In the “Design” sheet of the “Final Protocol Worksheet Ventilation IP” excel file the supply and return flow rates planned for each space (whether supply or extract) are entered into the relevant cells making sure that the total supply rate matches the total extract rate as depicted below.

3. Distribution of the airflow volume flow rate									
Nr.	Room (each valve individually)	Area		Room Volume	Air Volume Flow Rate			Air Change Rate n ACH (1/h)	Type of Flow-Off Vent (door gap, grid in door leaf door frame, grille...)
		A ft <sup>2</sup>	h ft		A x h ft <sup>3</sup>	V <sub>sup</sub> cfm	V <sub>ex</sub> cfm		
1	Bedroom 1	150.00	8.00	1200	25			1.25	door undercut
2	Bedroom 2	130.00	8.00	1040	20			1.15	door undercut
3	Bath 1	80.00	8.00	640		24		2.25	door undercut
4	Bath 2	80.00	8.00	640		12		1.13	door undercut
5	Kitchen	180.00	8.00	1440		36		1.50	open air
6	Living room	200.00	8.00	1600	35			1.31	open air
7	Hallway	100.00	8.00	800			84	6.30	door undercut
8	Mud room	80.00	8.00	640		8		0.75	door undercut
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
	sum	1000	---	8000	80.0	80.0	---	0.60	

Then in the “Initial Start Up” sheet of the same Excel file mentioned above, the person responsible for balancing the system enters the real or actual flow rates measured at each register using a digital anemometer. Often it will take at least two attempts to get the actual flow rates at each register to equate to the design rate (as depicted in the screen-grab below). On completion of the system set-up, there must be less than 10% imbalance between the total extract and total supply rates (in the example below, we have achieved a disbalance of 5%).

1. Record of the air flow volumes, supply and extract air																
Nr.	Room	Design			Measurement 1		Measurement 2		Measurement 3		Type of valve	Adjustment	Flow-Through V <sub>through</sub> ft <sup>3</sup> /min	Noise Measurement dB(A)	Filter Grade	Filter Clean?
		V <sub>sup</sub> cfm	V <sub>ex</sub> cfm	V <sub>through</sub> cfm	V <sub>sup</sub> cfm	V <sub>ex</sub> cfm	V <sub>sup</sub> cfm	V <sub>ex</sub> cfm	V <sub>sup</sub> cfm	V <sub>ex</sub> cfm						
1	Bedroom 1	25			22	24										yes / no
2	Bedroom 2	20			16	20										yes / no
3	Bath 1		24			28	24									yes / no
4	Bath 2		12			10	12									yes / no
5	Kitchen		36			32	35									yes / no
6	Living zone	35			40	36										yes / no
7	Hallway			84												yes / no
8	Mud room		8			12	9									yes / no
9																yes / no
10																yes / no
11																yes / no
12																yes / no
13																yes / no
14																yes / no
15																yes / no
16																yes / no
17																yes / no
18																yes / no
19																yes / no
20																yes / no
	sum	80.0	80.0	---	79.00	82.00	80.00	80.00								yes / no


  

2. Balance of airflow volume												
	Measurement 1		Measurement 2		Measurement 3		Disbalance	Type of Control	Adjustment	Noise Measurement dB(A)	Filter Grade	Filter Clean?
	V <sub>sup</sub> cfm	V <sub>ex</sub> cfm	V <sub>sup</sub> cfm	V <sub>ex</sub> cfm	V <sub>sup</sub> cfm	V <sub>ex</sub> cfm						
1. Fresh air inlet	77	---	78	---	---	---	5%					yes / no
2. Exhaust air outlet	---	83	---	82	---	---						yes / no

3. Initial start-up accomplished according to manufacturer's specifications:		
yes / no	Signature: _____	* PNE-G0811 - PNE Control 9/2020

The ventilation flow rate adjustment documentation must include at least the following:

- 
- Description of the property;
  - Property address;
  - Name and address of the tester;
  - Date and time of adjustment;
  - Make and model of the ventilation unit;
  - Adjusted volumetric flows per register at normal operation; and
  - Volumetric flow balance for outdoor air and exhaust air.

### **4.3 Declaration of the construction supervisor**

Full and complete implementation according to certified Passive House project planning must be documented and confirmed by the construction supervisor. Any variation in terms of implementation should be mentioned. For any products not mentioned in the plans, corresponding documentation must be provided. A template for this document can be provided upon request

### **4.4 Photographs**

Photographs should be taken of the insulation being installed at every level of the build-up, on every floor, roof, wall and basement wall. Photographs of the installed duct-work to the outside air and its insulation thickness should also be taken. You should also photograph every detail which involves a thermal break (for proof of installation), of every critical detail involving steel or timber with overlapping insulation and of window fitting details with their connecting/overlapping insulation. For at least one of each proof of element a measuring tape should be placed beside each insulation installation for proof/scale of thickness. "As many photographs as possible to document the construction process".

## 5. Fee Proposal

Please apply for fees for all projects.

If you have already availed of Pre-Certification for your Project then a reduced fee for Full Certification is included in the original quote.

All projects or multi-unit residential projects are charged according to a bespoke fee for that project. We will forward you a fee proposal for your project within 3 working days of receiving drawings and schematics from you.

If you decide to go ahead, we will require the following:


- Written instruction to proceed.
- All documents and drawings required for the Passive House Quality Approval Certificate (as above). Please note all required items are to be provided by you at your cost. Should you require assistance in preparing any of the required items we would be happy to quote for that separately.
- 25% deposit payable in advance.
- 50% due on complete review.
- Final 25% *prior* to issue of Certificate & compiled package.

*Note: If the project fails to achieve the Passive House Standard for any reason outside the control of Passive House Academy (such as failing to meet the required level of airtightness), Passive House Academy expects to be paid the full fee as quoted above.*

## 6. Publication on the Passive House Academy Website

We would like to publish your project once Certified on our website [www.passivehouseacademy.com](http://www.passivehouseacademy.com).

To enable this we will need the following:

- 
- Description of your project in max 100 words (an architectural overview, describing the design concept, the setting, materials and finishes, Client's brief...).
  - 2 high quality exterior images and 2 high quality interior images.
  - Names and web addresses of the key design team members as well as the Contractor so that visitors to our site can get in touch.

### *General Terms & Conditions*

*Advice on general queries on this or other projects outside the fixed fee proposal noted above would be charged on a time basis and agreed in advance.*

*All comments / details provided will only concern the thermal performance of the building in relation to the PHPP report. Your Architect will remain responsible for the performance of the details in terms of all Building Codes, water penetration, weathering, structural performance, aesthetics, durability, retention of guarantees and so forth.*

*Passive House Academy will act as consultants to your Architect. Passive House Academy will require your Architect and other consultants involved in the project to carry Professional Indemnity Insurance at the appropriate level for the value of the particular project.*

*A condition of contract is that Passive House Academy is mentioned as the Certifier in the event of any kind of publication of the building for which its service is provided.*



## Contact Us:

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## Passive House Pre-Certification & Certification

### Information Checklist

1) Minimum Documentation Required for Commencement	required	incomplete	complete
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1.1) Completed PHPP file	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2) Site Plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3) Plans, Elevations & Sections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4) Photographs of Surroundings (labelled as to orientation)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5) Google Map Link of Exact Location	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6) Proposed Construction Details showing:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1) Thickness of each material			
2) Lambda or R per Inch of each material			
3) Center and thickness of steel or wood studs			
4) Gauge of steel studs			

*Note: Both printed pdf set and dwg files are needed for all Design Drawings*

2) Additionally Required Documentation	required	incomplete	complete
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2.1) Technical Brochures for all insulation products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(don't forget to highlight your product if there are multiple values)



<b>2) Additionally Required Documentation</b>	<b>required</b>	<b>incomplete</b>	<b>complete</b>
<b>2.2) Technical specification for windows</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1) Psi Glass Edge according to ISO EN 10077-2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) $U_f$ according to ISO EN 10077-2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) $U_g$ according to ISO EN 673	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) G-Value/SHGC according to ISO EN 410	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) Psi Install according to ISO EN 10211	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Widths of frames for top, bottom and sides	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>2.3) Technical specification for glazed doors</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1) Psi Glass Edge according to ISO EN 10077-2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) $U_f$ according to ISO EN 10077-2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) $U_g$ according to ISO EN 673	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) G-Value/SHGC according to ISO EN 410	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) Psi Install according to ISO EN 10211	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Widths of frames for top, bottom and sides	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>2.4) Technical Information for ventilation unit</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4.1) Ventilation Layout	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4.2) Efficiency and Electrical Consumption	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4.3) Ambient air duct; Insulation, thickness, length and diameter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



<b>2) Additionally Required Documentation</b>	required	incomplete	complete
<b>2.5)</b> Information about the sub-soil heat exchanger (only if used)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>2.6)</b> Primary Energy – Heating, Cooling and Hot Water Production Description	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>2.7)</b> Technical brochures stating efficiencies of mechanical equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1) Heating Efficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Cooling Efficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Hot Water Production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Hot Water Storage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>2.8)</b> Hot water and heating supply pipelines (lengths, dimensions, thickness and level of insulation if any, circulation loop)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>3) Additional Documentation for Schools and Offices</b>	required	incomplete	complete
<b>3.1)</b> A usage profile indicating the occupancy times and frequencies of absenteeism for all spaces within the building	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>3.2)</b> A lighting layout with a legend indicating the wattage of each fixture in the building	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>3.3)</b> An equipment and appliance schedule with the power consumption of all electronic devices.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



<b>4) Certification Verifications and Declarations for Full Certification Only</b>	required	incomplete	complete
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- |   |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|
| <b>4.1)</b> Verification of the airtight building envelope in accordance with EN ISO 13829 (This standard is currently under review please check to see if updated) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>4.2)</b> Documentation of the flow rate adjustment(balancing the ventilation system)   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>4.3)</b> Declaration of the construction supervisor  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>4.4)</b> Photographs   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |