

# Certified Passive House Designer



## Examination regulations

### 1 Requirements and overview

The Passive House Institute in Darmstadt (from now on referred to as PHI) developed the certificate named “Certified Passive House Designer” / “Certified Passive House Consultant” so that individuals may have the possibility of proving a subject related qualification in the field of particularly energy efficient construction.

In order to qualify for a certificate a verified qualification in an appropriate professional field is required. A copy of this qualification must be made available to the PHI. The acquired title after completing the certifying course is supplemented by a term describing the candidate’s professional qualification (e.g. “Certified Passive House Designer – Architect”, “Certified Passive House Designer – Carpenter”). Candidates who don’t have a subject related qualification will obtain the title “Certified Passive House Consultant”. The authority to make the decision whether a candidate can become a certified “**designer**” or a certified “**consultant**” is reserved by the PHI.

There are two methods for obtaining the “Certified Passive House Designer” certificate for the first time, these are documented in Sections 2 (written exam) and 3 (qualification through a Passive House model project).

The only means of becoming a “Certified Passive House Consultant” is by passing the written examination.

Section 4 describes how the certificate is issued. All certified designers and consultants are published on the Passive House Institute’s publicly accessible website [www.PassivhausPlaner.eu](http://www.PassivhausPlaner.eu).

The obtained certificate’s validity is limited to three years. An extension can be obtained if the designer submits the evidence listed in Section 5 (extension).

### 2 Written Examination

The first alternative for obtaining the certificate is through the completion of a written examination according to the procedures described in Section 2 of these examination regulations.

## **2.1 Examination dates**

Examinations are offered at irregular intervals by institutions for further education who work together with the PHI under contract. All examination dates and hosts are published on the PHI's website.

Possible examination dates for an entire year are decided upon by the PHI in October of the previous year.

## **2.2 Prerequisites for examination attendance**

Every person who meets the conditions stated in section 1 is allowed to apply for any available examination date. The hosting institution for further education may limit the number of participants on a first come, first served principle based on the receipt of the informal written application.

## **2.3 Location, time, number of participants, supervision**

The exam's location, time, maximum number of participants and supervision are determined by the hosting institution. The supervisors must be able to guarantee that the examination is carried out according to the rules laid out in these regulations.

## **2.4 Fees**

Exam participation is subject to a fee. Every participant must pay a charge fixed by the hosting institution for further education. This fee covers all expenses for the examination, marking and - in case of passing the exam – issue of the certificate and listing of the certified Passive House designer on the PHI's website for three years after the certificate has been handed over. The fees are to be paid in advance irrespective of examination success.

## **2.5 Examination questions and annulment**

The exam questions are compiled by the PHI according to the list of learning targets (Appendix I of these regulations). An electronic copy of the examination is given to the hosting institution one day before the exam. The correct number of documents (one copy for every participant) must be stored inaccessibly and printed and tacked by the examination host.

If, in opposition to these regulations, any participant should gain access to the exam questions before the examination date, the examination will be annulled. Examination fees will not be refunded. Participants who were involved in the attempt to defraud will be barred from exam participation for one year. If the hosting institution or any of its representatives is responsible for the fraud, it will be excluded from offering further examinations for one year and until credible evidence of reliability is produced.

## **2.6 Examination procedure, duration, permissible aids, certification**

A printed version of all questions that need to be answered in written form will be handed to the participant on the date of examination.

The duration of the written examination is three hours.

Before the examination every participant fills in the Application for Admission to the Examination “Certified Passive House Designer” (Appendix II of these regulations) on page two of the answering booklet. By signing the form the candidate accepts the terms and conditions listed in these examination regulations. Alternatively, a candidate may wish to complete the same Application for Admission to the Examination “Certified Passive House Designer” in advance and bring a signed copy on the date of examination.

A certified copy of the participant’s professional qualification must be handed in on the date of examination at the latest, if not already done.

Every participant must answer the questions independently and without communication with other persons. Only writing utensils with indelible ink may be used. In particular, the hosting institution must ensure that no pencils are used. In his/her own interest every participant should ensure that his/her writing is easily legible. Illegible parts won’t be evaluated and will count as omissions.

The questions should generally be answered in written form. As far as possible the participant should use the answering space provided by the hosting institution. Papers may not be removed from the examination room; the participant should clearly cross out any writing that he/she wishes to be disregarded. Supplementary information can be added on the supplied pages but no further attachments can be made. Immediately after the papers are submitted, the host checks that the question and answering documents are complete.

At the end of the written examination the participants must submit all question and answering booklets with which they were provided. There is no right of retention.

The host will give a written confirmation of participation to every participant.

**Permissible exam aids:** Course documents and textbooks, calculator or other calculation aids.

**Not permissible aids:** Programmable calculators, mobile phones and all devices that allow connection to the internet or later publishing of the examination questions.

## **2.7 Sample solution**

The PHI will provide the organising institute with a sample solution, which includes the number of points to be awarded for each section. This set of solutions will be made available solely to the first marker and should not be passed on. The PHI reserves the right to publish the example solutions of completed examinations on the internet.

## **2.8 Marking of the examination papers**

The submitted question booklets and answer booklets shall be corrected by the examining institute within three weeks. Marks will be awarded according to the points set out by the PHI. Checking of the papers will be done with regard to the correctness of the contents – this can differ from the sample solution, but must have the same worth as regards the contents. Points will be deducted for each content-related mistake in every case. Likewise a point will be deducted for unclear presentation. Spelling mistakes and phrasing errors etc. will be corrected, however they will incur a total deduction of 2 points at the most from the overall result.

All first-marked question booklets and answer booklets shall be sent to the PHI by the examining institute within three weeks at the latest. The PHI will check the marking within the next three weeks. The examination is deemed to have been passed when at least 50% of marks have been achieved of the total number of points possible.

## **2.9 Examination results**

Every participant is informed of his/her result via email (“pass” or “fail”). In case of failing the exam the participant is permitted to make an appointment to view the marked papers at the PHI. At the appointment the participant may point out inappropriate marking, which will be recorded.. Within two weeks the PHI shall decide whether any subsequent correction is necessary and will carry these out within two further weeks. In case of this, the correction and result on hand will be final. There will be no further right for access. Legal recourse is excluded.

### **3 Qualification through a Passive House model project**

The qualification outlined in this Section describes an alternative method of obtaining the certificate for a “Certified Passive House Designer.” The prerequisites listed in Section 1 are valid nonetheless.

Credible proof that the applicant has exercised full responsibility for the project planning and design of the building is necessary for acquiring the “Certified Passive House Designer” certificate with the Passive House model project.

#### **3.1 Definition: Passive House model project**

According to these regulations a Passive House model project is a building, which complies with the following conditions:

- The building has been completed and is being used for residential purposes.
- The building is a Passive House which has been certified according to PHI criteria by a PHI-approved certification authority. A copy of the certificate is supplied with the application.
- The PHPP calculations of the model project are part of the application. They are given to the PHI in electronic form (open Excel file)
- A detailed description according to Appendix III, pictures included, is made available to the PHI in electronic form as a pdf and Microsoft Word file (please save as “Word 2000” document or, alternatively, as an rtf file). The PHI reserves the right to demand changes to the description and to publish this description on the internet.
- The building is listed in the online database “Built Passive House Projects”

#### **3.2 Application process**

A designer applies for the certificate

“Certified Passive House Designer”

at the PHI according to Appendix IV. In the case of qualification through a Passive House model project this application should be completed with the following documents:

1. Copy of the professional qualification certificate
2. Attestation of a Passive House model project according to the definition laid out above and all relevant documents:
  - Copy of the building's certificate and specification of the certifying body
  - Electronic copy of the PHPP
  - Electronic copy of the project description
  - Specification of the building's number in the online database "Built Passive House Projects"
3. Acknowledgement by signature that the applicant has designed, and is responsible for the project documented under section 2. The certificate will be revoked, should this declaration turn out not to be true. In serious cases the PHI reserves the right to ban such applicants for an indefinite period of time.

### **3.3 Verification fee, inclusion in the database**

After receipt of the application to become a "Certified Passive House Designer / Consultant", the PHI will make out an invoice for the verification fee according to the tariffs laid out in Appendix VI. This charge covers all efforts for verification, issue of the certificate (if applicable) and inclusion in the database for three years. The regulations for possible extension after three years are laid out in Section 5. The fee is charged for the verification process. A certificate will only be issued if all requirements are fulfilled. The burden of proof resides with the applicant.

The PHI verifies the documents within three weeks upon receipt of the fee. The PHI reserves the right to demand changes in the documents, which must then be revised and resubmitted by the applicant. The applicant will be informed by the PHI if the building is suitable as a Passive House model project. All verified documents and the applicant will be published on the internet as "Applicant with a Passive House Model Project".

If no votes against the application are pronounced within three weeks of this publication, the certificate for a

"Certified Passive House Designer"

is issued and the annotation "applicant" deleted from the website.

## **4 Issue of the certificate**

After passing the written examination (Section 2) or the process of qualification through a Passive House model project (Section 3), the Passive House Institute issues the certificate

“Certified Passive House Designer” or “Certified Passive House Consultant”

and sends this to the applicant. The PHI reserves the right to decide whether the title is to be “Certified Passive House **Designer**” or “Certified Passive House **Consultant**”. Declarations listed in Appendix II of this document (Application for Admission to the Examination) will be used concerning the title supplement describing the certified designer’s / consultant’s professional qualification, which is also quoted on the certificate. The applicant is included in the list of “Certified Passive House Designers”, which is published online at [www.passivhausplaner.eu](http://www.passivhausplaner.eu)

The certificate is valid for three years. The regulations for possible extension are laid out in Section 5.

The participant is permitted to use his / her certificate for advertising purposes. He / she must, however, keep in mind the correct presentation following the format of the template (Appendix IV of these regulations). Only the unmodified trade mark on this template may be used. The certified designer / consultant has no right to use other PHI trademarked symbols unless there is an additional contractual agreement.

## **5 Extension of the certificate “Certified Passive House Designer” / “Certified Passive House Consultant”**

The certificate is valid for three years at a time. The regulations for a possible extension for a period of another three years are laid out in this Section.

### **5.1 Application for a certificate extension**

The application form is included in Appendix V of this document. It must be handed in while the existing certificate is still valid.

The application must be supplemented with a Passive House model project that was implemented during the validity period of the existing certificate but that has not yet been handed in.

1. Attestation of a Passive House model project according to the definition laid out in Section 3 and all relevant documents:
  - Copy of the building's certificate and specification of the certifying body
  - Electronic copy of the PHPP
  - Electronic copy of the project description
  - Specification of the building's number in the online database "Built Passive House Projects"
2. Acknowledgement by signature that the project documented under section 1 was accountably planned by the applicant. The certificate will be revoked, should this declaration turn out not to be true. In severe cases the PHI reserves the right to bar applicants where annulment had been necessity for an indefinite period of time.
3. Verification by signature of the certified Passive House consultant that the essential parts of the project documented under section 1 were developed and planned by the applicant. A detailed description must be given of the type and complexity of all sections dealt with by the applicant separately from the work completed by others. This should be backed up with a statement submitted by the liable designer. The certificate will be revoked, should this information turn out not to be true. In severe cases the PHI reserves the right to bar applicants where annulment had been necessity for an indefinite period of time.

## **5.2 Verification fee in case of extension**

After receipt of the application for extension, the PHI will make out an invoice for the verification fee according to the tariffs laid out in Appendix VI. This charge covers all efforts for verification, extension of the certificate (if applicable) and inclusion in the database for another three years. The fee is charged for the verification process. The certificate will only be extended if all requirements are fulfilled. The burden of proof resides with the applicant.

The PHI verifies the documents within three weeks upon receipt of the fee. The PHI reserves the right to demand changes in the documents, which must then be carried out and resubmitted by the applicant. After verification the description of the object will be published on the internet and the certificate for the

"Certified Passive House Designer" or "Certified Passive House Consultant"

extended for another three years.



## **6 Cases of fraud, certificate annulment**

If it transpires that a participant through his own fault has not, or has not fully provided proof of eligibility, or has violated any provisions of these examination Regulations, the PHI will revoke his certificate. He will be informed of this in writing. In that case, the participant must cease using the "Passive House Certified Designer" trademark with immediate effect, and must also remove it from all distributed documents and appearances (e.g. internet presence). In severe cases the PHI reserves the right for legal action and reserves the right to ban the participant from further examinations indefinitely.

## **7 Written form, acknowledgement of the examination regulations, validity period of these regulations, severability clause, court of jurisdiction**

All agreements between the participant, the hosting institution and the PHI must be carried out in written form.

With this application for admission to the examination the participant acknowledges the provisions of these Examination Regulations, in particular the exclusion of legal action regarding the correction of the solutions and reviewing of the Passive House model projects.

This agreement comes into effect on 8<sup>th</sup> September 2008 and is valid indefinitely until a new version becomes operative. The validity of all older exam regulations expires on 8<sup>th</sup> September 2008, they are replaced with the version at hand. The participants are bound by the provisions of these Examination Regulations for the duration of the agreed period.

The PHI reserves the right to make any changes that will be published before coming into effect.

If a provision of this contract becomes invalid, this shall not affect the validity of the remaining provisions of the contract. The invalid provision shall be replaced with another provision that comes closest to the purpose of this agreement.

The place of jurisdiction is Darmstadt.

# Appendix I

## List of learning targets

### “Certified Passive House Designer”

This list of learning targets assumes that the trainees who are to become certified Passive House planners are already familiar with the conventional practices of construction and basics of building physics (e.g. trained architects, engineers). Only the most important principles of building physics that are directly related to the construction of Passive Houses will be revised.

- **Definition of a Passive House**

Knowledge of the climate independent definition of a Passive House and how this is derived: The maximum heating load must be smaller than the heat that can be supplied to the building through the hygienically required fresh air flow.

{ $p_{\max, \text{heat}} \leq 10 \text{ W/m}^2$  for residential buildings}.

Knowledge of hygiene demands for ventilation systems (DIN 1946).

Knowledge of the relationship between the relative interior air humidity and the effective air exchange under cold weather conditions.

- **Passive House criteria**

Heating load	$p_{\max, \text{heat}} \leq p_{\text{supply air, max}}$	{generally true}
Annual space heat requirement	$q_{\max, \text{heat}} \leq 15 \text{ kWh}/(\text{m}^2\text{a})$	{Central Europe}
Air tightness	$n_{50} \leq 0,6 \text{ h}^{-1}$	{generally true}
Why is this an independent condition?		
Yearly primary energy needs	$e_{\max, \text{prim}} \leq 120 \text{ kWh}/(\text{m}^2\text{a})$	{generally true}
Which energy services are included in the definition of $e_{\max, \text{prim}}$ ?		
Frequency of excess temperature	$t_{\max, 9>25^\circ\text{C}} \leq 10\% t_{\text{use}}$	{generally true}

Thorough understanding of the meaning and use of the terms heating load, annual space heat requirement,  $n_{50}$ -value, primary energy, final energy, energy services, frequency of excess temperature. Understanding of the importance and impact of the treated floor area  $A_{TFA}$ . What is the definition of the reference area for a Passive House?

- **Basic principles of planning a Passive House**

### 1.1 Thermal insulation fundamentals

The principle of a thermally insulating envelope must be understood. A good perception of the heat insulation qualities required by a Passive House in terms of both the insulation thickness and quality and the prevention of thermal bridges is needed. The relationship between extensive and complicated thermal envelopes and the respective building costs must be known.

- Link between U-values and the internal surface temperature
- Typical U-values of opaque building structures for Passive Houses
- Typical lightweight and solid structure constructions suitable for Passive Houses
- Handling of heat loss coefficients for thermal bridges (exterior and interior dimensions) and ability to qualitatively analyse a building's envelope in terms of potential thermal bridges.
- Understanding of the principle of thermal-bridge-free construction.
- Knowledge of suitable insulating materials and their essential characteristics.

### 1.2 Fundamentals of a building's air-tight envelope

Why is air-tightness so important?

Understanding of the principle of "one air-tight envelope".

Knowledge of suitable lightweight and solid constructions in terms of air-tightness.

Knowledge of suitable air-tight joints for lightweight, solid structure and mixed construction.

Knowledge of suitable air sealing measures in case of leakages.

Recognition of potential weak spots.

Awareness of the planning task "air-tightness".

Knowledge of test procedures (air-tightness test) and requirements.  
Understanding of basic leakage points (e.g. holes from nails, power sockets, connection joints of windows, unrendered surfaces on exterior walls, loose foil adhesion, unsealed penetrations, unsealed downpipes).  
Knowledge of how to permanently fix simple leakage points.  
Appreciation of difficult leakage points (timber flooring in solid structure buildings; unrendered exterior walls behind interior linings (e.g. stairs); regular penetrations (e.g. continuous rafters)).  
Knowledge of how problematic leakages can be avoided.

### 1.3 Fundamentals of transparent exterior components

- **Knowledge of window U-values according to EN 10077**

Confidently handling values  $U_g$ ,  $U_f$ ,  $\Psi_g$  and the heat loss coefficient of thermal bridges around fixtures  $\Psi_{\text{mount}}$ .

Difference between “certified Passive House windows” and “examined fittings”.

Understanding of the conditions for thermal comfort (criteria for interior temperatures on windows suitable for Passive Houses).

Estimation and determination of the proportion of frames.

Triple low-e-glazing layout and knowledge of the main heat transfer mechanisms. (Heat conduction through the filling gas, radiation of heat, low-e layer, convection).

Design of a window’s glass edge system. What is the purpose of the system at the glass edge?

Why is a thermally optimised glass edge (warm-edge) important?

Which possibilities are there for reducing the heat loss coefficient of thermal bridges at the edge of the glazing? (warm-edge, deep glazing rebate).

What properties are required for a Passive House window? (Knowledge of all characteristic data, possibly compensating radiators)

Confident use of PHPP’s window sheet.

- **Knowledge of heat gain through windows according to PHPP**

Knowledge of the g-value definition according to EN 410.

What is the difference to the degree of light transmission (ISO 9050)?

Knowledge of typical values for different types of glazing.

Which other factors reduce the solar energy gain? (Angle of incidence, dirt, frame-to-glass ratio, shading, reflection)

Estimation and determination of glass-to-frame ratio.

Simple examples of energy flow through windows (cold day, heating period, summer)  
Knowledge of the glazing energy criterion  $U_g - 1,6 \text{ W}/(\text{m}^2\text{K}) \cdot g \leq 0$  and how it is applied.

Knowledge of the influence that a building's orientation has on the solar energy supply.

Knowledge of the impact of a typical self-shading situation on the solar energy supply.

Confident use of PHPP's shading sheet.

- **Knowledge of the impact windows have on the comfort during summer**

Solar thermal load during summer months: why is this value so high?

The connection between a building's orientation and solar thermal loads during summer months (qualitative understanding).

Provisions in case of high thermal loads (qualitative analysis).

Knowledge of limits imposed on transparent surfaces without temporary shading.

Knowledge of the difference between interior and external temporary shading.

Confident use of PHPP's summer shading sheet.

- **Ventilation fundamentals in a Passive House**

#### **1.4 Why is ventilation essential?**

Knowledge of the the most important air contaminants inside a building.

Knowledge of the the CO<sub>2</sub> criterion [DIN 1946].

Determination of fresh air flow rate for hygienically adequate ventilation [Pfluger 2003].

Relationship between the relative inside air humidity and the sources of indoor humidity, the rate of fresh air supply and the external temperature.

Why does the air flow also have to be limited during winter? What can be done in case of high ventilation being required for other urgent reasons?

#### **1.5 Non-mechanical ventilation**

Driving forces of non-mechanical ventilation (qualitative understanding)

Types of non-mechanical ventilation: joints and cracks, tilted windows, room airing by means of widely opened windows.

Factors that will influence the non-mechanical ventilation. Typical air exchange rates (qualitative understanding).

Why is non-mechanical ventilation not suitable for Passive Houses located in regions with a considerable amount of heating degree days? (two sections: unreliability, heat losses)

## **1.6 Exhaust air ventilation**

General layout of an exhaust air ventilation system (residential construction): Areas for air supply, transferred air and air extraction. (Ability to identify these zones in floor plans).

Knowledge of essential components: air inlet, extraction air outlet, exhaust air fan, filters.

Identification of advantages of air extraction devices over non-mechanical airing.

Why should air extraction devices not be applied in Passive Houses in regions with a considerable amount of heating degree days? (heat losses)

## **1.7 Balanced air supply and extraction units with heat recovery**

General layout of an air supply and extraction device (in flats): Areas for air supply, transferred air and air extraction. (Ability to identify these zones in floor plans).

Knowledge of essential components: supply air inlet, supply air ducting, openings for transferred air, extraction air outlet, extraction air ducting, baffle crosses, air filters, central unit (and its components).

Knowledge of the the typical dimensions of such ventilation devices [DIN 1946][PHPP].

Knowledge of the air circulation: mixing ventilation.

Knowledge of the the Coanda effect.

Potential and limits of decentralised systems.

Typical solutions and their assessment.

Ability to mark supply and extraction points in floor plans.

Knowledge of the required filter qualities and why these are necessary.

Knowledge of the the hygienic requirements for Passive House ventilation systems (no cooling, no active dehumidification and humidification, continuous/dry operation, upstream fresh air filter EU-class F7 or better (and reasons for this). Literature: [AkkP 23].

Exterior air inlets: what needs to be taken into consideration? (filter, hygiene (suction point), protection from the elements, condensation and frost, sound insulation).

Knowledge of the suitable ducting. Basics of planning ducts (short pathways, smooth surfaces, fittings, typical cross sections, air-tightness).

Under which conditions does duct insulation become necessary and how is it done properly? (Generally: cold ducts in warm rooms, in case of night cooling or heating, protection from condensation)

Knowledge of the requirements for central ventilation units suitable for Passive Houses.

Significance of the specific electricity use.

Basic knowledge on how to set up central units.

Fundamentals of noise protection.

How to correctly include a ventilation unit in PHPP.

Significance of balancing settings. How to adjust / balance a ventilation system?

## • Principles of heating systems for Passive Houses

Knowledge of the heating load criterion. What is the difference between “heating load” and “space heating requirement”.

Knowledge of the thermal comfort requirements [ISO 7730].

What is meant by the “operative temperature”?

How significant are draughts?

By how much can the air temperature and average surface temperature differ in a Passive House? (Ability to calculate a simplified example and make qualitative estimations)

Why is thermal comfort in a Passive House to a large extent independent of the means of heat/cold transfer to the room?

Knowledge of typical heating loads.

Knowledge of typical heat distribution strategies suitable for Passive Houses.

In which situations should radiators be positioned beneath windows?

Ability to sketch a heat distribution system into the floor plan of a Passive House.

What needs to be taken into consideration when considering air heater coils? (dependence of the available heating capacity on air volume flow)

Why can't the supply air flow rate be increased?

How does PHPP deal with heating loads [Bisanz 1999]?

What factors need to be taken into consideration when designing the heat distribution and the central heat generator? (the total heating load must be accounted for)

How and to what extent can there be temperature differences within a Passive House?

How is the maximum heating load (qualitatively) influenced by the following factors: large leakages, constantly tilted windows, temporarily opened windows, opening of the front door.

Knowledge of the limits imposed on supply air heat distribution (decoupled rooms,

rooms with air extraction). Solutions for these cases.  
Correct positioning of a thermostat within a dwelling unit.

- **Fundamentals on thermal comfort during the summer period**

Thermal comfort standards [ISO 7730]

Influencing factors on comfort during the summer period (qualitative understanding):

Air exchange – assessment methods? How can it be increased?

Solar load: significance, dependence on the building's orientation and the transparent surfaces, shading, temporary shading, effectiveness of interior and exterior blinds.

Impact of interior heat sources. How can they be reduced?

Impact of exterior colour [Kah 2005].

Impact of insulation [Kah 2005].

Impact of thermal masses inside the building [Feist 1999]. What happens in the special case of strongly fluctuating interior loads [Kah 2006]?

- **Electrical energy**

Characteristics of electrical energy.

Why is energy efficiency especially important when it comes to electrical energy?

Typical electrical consumption of a Passive House's technical building services (auxiliary electricity).

Energy efficiency requirements for auxiliary power consumption.

Typical electricity consumption of domestic use

Improving the energy efficiency of domestic electrical devices.

Typical electricity consumption of offices.

Improving energy efficiency in offices. Why is this of high importance?

- **Principles of drawing energy balances (PHPP)**

Principles of drawing energy balances: volume and envelope for energy balance, balance equation.

Contributions to energy losses: transmission, ventilation.

Contributions to energy gains: interior heat sources, passive solar contributions, heating.

Calculation of losses through transmission and ventilation. Order of magnitude estimations.



Calculation of a window's U-value according to PHPP. Calculation of solar heat gains especially taking into account shading.

Significance of interior heat sources.

Calculation of the heat load according to PHPP: why two-design-days method?  
[Bisanz 1999]

Dimensioning the ventilation system according to PHPP.

Heat dissipation of hot water pipes and storage tanks.

Compact building services units in PHPP.

How to deal with products that are not certified (guarantee of characteristic properties)

## • **Basics of economic efficiency calculation**

Payback period, present value method, annuity method [Feist 2005][VDI 2067], application of the annuity method to simple examples

Correct determination of excess investment.

Life span assessment.

Economically effective insulation level [Feist 2005].

## • **Invitations to tender and allocation**

Which factors need to be taken into account? Well-written invitations to tender.

## • **Construction site management and quality control**

Which trade sectors are affected?

Information that must be given to the workmen before any work is carried out.

Services that need to be tested and how this can be done.

- Air-tightness
- Thermal-bridge-free construction in accordance with planning
- Window installation
- Thermal insulation
- Air ducts: no leakage, layout/dimensions in accordance with plans, insulation, prevention of condensation
- Ventilation unit: in accordance with plans, air volume flow check, balancing
- Space heating system: test run

Procedures that need to be carried out for quality control purposes (air leakage test, quality assurance appointments for the installation of windows, completion of the air tight layer, installation of the insulation, installation of air ducts, inspection of the ventilation unit)

Handing over the building with an appropriate interior temperature (warm in winter and cool in summer periods).

- **Information and support for occupants**

What kind of information do occupants of Passive Houses need?

Opening windows: Effect during the winter and summer periods.

Temporary shading: Effect during winter and summer periods.

Ventilation unit is not an air conditioning system; maintenance requirements: changing filters; permanent use or shutdown with dry filters.

How to avoid dry air in winter.

Who do I ask if I have any questions?

- **Refurbishments using Passive House components**

Advantages of using Passive House components [AkkP 24]

Examples

Warning: interior insulation [AkkP 32]

- **Literature**

[AkkP 5] Energy Balance and Temperature Characteristics; Protocol Volume No. 5 of the Working Group Cost-efficient Passive Houses, 1st Edition, Passive House Institute, Darmstadt 1997

[AkkP 9] Usage Patterns, Protocol Volume No. 9 of the Working Group Cost-efficient Passive Houses Phase II; 1<sup>st</sup> Edition, Passive House Institute, Darmstadt 1997.

[AkkP 14] Passive House Windows, Protocol Volume No. 14, 1<sup>st</sup> Edition, Passive House Institute, Darmstadt 1998

[AkkP 16] Thermal-bridge-free Designing; Protocol Volume No. 16 of the Working Group Cost-efficient Passive Houses, 1<sup>st</sup> Edition, Passive House Institute, Darmstadt 1999

[AkkP 20] Passive House Supply Engineering; Protocol Volume No. 20 of the Working Group Cost-efficient Passive Houses, 1<sup>st</sup> Edition, Passive House Institute, Darmstadt 2000

[AkkP 21] Architectural Examples: Residential Buildings, Protocol Volume No. 21 of the Working Group Cost-efficient Passive Houses Phase III; Passive House Institute, Darmstadt 2002.

[AkkP 23] Influence of the Ventilation Strategy on the Concentration and Spread of Harmful Substances in Rooms, Protocol Volume No. 23 of the Working Group Cost-efficient Passive Houses Phase III; Passive House Institute; Darmstadt 2003.

[AkkP 24] Application of Passive House Technologies in Renovation of Older Housing; Protocol Volume No. 24 of the Working Group Cost-efficient Passive Houses Phase III; Passive House Institute; Darmstadt 2003.

[AkkP 25] Temperature Differentiation in the Home, Protocol Volume No. 25 of the Working Group Cost-efficient Passive Houses Phase III; Passive House Institute; Darmstadt 2003.

[AkkP 27] Heat Losses through the Ground, Protocol Volume No. 27 of the Working Group Cost-efficient Passive Houses Phase III; Passive House Institute; Darmstadt 2004.

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# Attachment II

## Application for admission to the examination "Certified Passive House Designer"



Personal information for processing the certification	
Mr/Mrs <sup>1)</sup>	→ ☼
Name <sup>1)</sup> , surname <sup>1)</sup>	→ ☼
Date of birth <sup>1)</sup>	
Street <sup>1)</sup>	
ZIP code, City <sup>1)</sup>	
Telephone <sup>1)</sup>	
E-mail <sup>1)</sup>	
Information for publication on www.passivhausplaner.eu and for the certificate	
Street <sup>1)</sup>	→ ☼
ZIP code, City <sup>1)</sup>	→ ☼
Nationality <sup>1)</sup>	
County <sup>1)</sup>	
Title <sup>1)</sup> (e.g. Dr. or Dipl.-Ing. (FH))	→ ☼
Professional designation <sup>1)</sup>	→ ☼
<i>A copy of the papers (e.g. Diploma) that prove that the professional title given above is justified is attached.</i> <input type="checkbox"/> YES <input type="checkbox"/> NO	
Telephone	
E-Mail <sup>1)</sup>	→ ☼
<i>Please give an e-mail address at which the certificate holder can be contacted.</i>	
Internet address	
Member of IG-PASSIVHAUS <input type="checkbox"/> YES (which?) <input type="checkbox"/> NO	→ ☼
I hereby apply for admission to the examination for attainment of the PHI's "Certified Passive House Designer" certificate and for inclusion in the appropriate internet database for a period of 3 years. <ul style="list-style-type: none"> <li>• I acknowledge the examination regulations dated 15.10.2008 with my signature.</li> <li>• In particular, I acknowledge that a legal challenge cannot be made for correction of the written examination results.</li> <li>• I affirm with my signature that the information I have given above is correct.</li> <li>• I have paid or will pay the examination fees in accordance with the examination regulations.</li> <li>• I affirm that the documents handed in by me represent my own intellectual accomplishments.</li> </ul>	
Date of examination: ..... Location: .....	
Examination carried out by: .....	
City <sup>1)</sup> : .....	Legally valid signature <sup>1)</sup>
Date <sup>1)</sup> : .....	.....

<sup>1)</sup> Information is required

→☼ This information will be published in the list of certified passive house designers.