

REPORT

D2.9 - DESCRIPTION FOR A DESIGN-STAGE-APPROVAL CONCEPT



Description for a design-stage-approval concept (D 2.9)

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OUTPHIT – DEEP RETROFITS MADE FASTER, CHEAPER AND MORE RELIABLE

outPHit pairs such approaches with the rigour of Passive House principles to make deep retrofits cost-effective, faster and more reliable. On the basis of case studies across Europe and in collaboration with a wide variety of stakeholders, outPHit is addressing barriers to the uptake of high quality deep retrofits while facilitating the development of high performance renovation systems, tools for decision making and quality assurance safeguards. outphit.eu



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INTRODUCTION

EnerPHit is an international high efficiency standard for building retrofits, based on Passive House principles and construction components. The EnerPHit standard offers immense benefits. These include significantly increased supply and crisis security and improved residential health and domestic value creation. The low heating load relieves the grid in the sustainable supply structure of the future.

A building that fulfils the EnerPHit criteria as defined by the Passive House Institute can be certified by a member of the international network of accredited Passive House certifiers. EnerPHit certification is typically done in at least three steps, with a rough check at early design stage, a detailed check before start of construction works and a final check after completion of the renovation measures.



Passive House seal



EnerPHit seal



PHI Low Energy Building seal

Download: [Criteria for the Passive House, EnerPHit and PHI Low Energy Building Standards](#)

The outPHit project promotes a streamlined renovation process, such as prefabricated construction elements (e.g. insulated wall panels) or one-stop-shop models. In such renovation approaches changes to the energy efficiency properties of the components or connection details during on-site construction works are not possible any more. Thus a thorough check of the construction planning and the energy balance calculation before start of the construction works becomes especially important. The involved parties also need a clear approval or go-ahead by the certifier or other qualified expert in order to be

sure, that the desired efficiency standard will be achieved. Failure to achieve the standard could lead to withdrawal of government funding or compensation claims by the investor.

Thus a formalised procedure for the Design Stage Approval will be very helpful for the parties involved in a renovation project. This paper aims to draft a concept for the design stage approval process (DSA) and the resulting document called Design Stage Approval Letter (DSAL). The approach will be applied to the outPHit renovation projects. The results of this test will be integrated into the final version of the DSA concept.

AT WHAT POINT OF TIME DOES THE PASSIVE HOUSE CERTIFIER ISSUE THE DSAL?

There are three points of time, when a DSAL can be issued:

1. Some government funding programs require Passive House Certification. In order to give a first funding approval they might already ask for a DSAL in the early design phase at the time of permit planning.
2. However, typically the certifier will issue the DSAL at the end of the construction design phase before the call for tenders. This way the architect can be sure that the calls for tenders are in line with the requirements for Passive House certification.
3. Sometimes the contractors will adapt or further specify the construction drawings to a considerable extent. Moreover the construction products actually used, might have different characteristic values than originally specified in PHPP. In this case a later DSAL that takes these changes into account might be needed.

The DSA is an instrument for quality assurance and attestation during the design stage. Therefore DSALs are generally not issued at later stages during the construction phase.

CHRONOLOGY AND ALLOCATION OF TASKS

The DSA process is intended for projects aiming at certification to one of Passive House Institute's energy efficiency standards for buildings. Therefore the involved energy consultants and designers usually have an education as Passive House Designer/Consultant.

A typical chronology of a renovation project with a DSA at the end of the construction design phase could be as follows (variations of this process are possible):

- Permit planning
 - architect/designer defines overall design of the building, ideally in close cooperation with engineers and a Passive House Consultant, who creates the first PHPP version;
 - Passive House certifier does preliminary/rough review of drawings and PHPP
- Detailed design
 - architect/designer/engineers create more detailed design for call for tenders;
 - Passive House Consultant updates PHPP

- Passive House Certifier checks PHPP. If everything is OK, the Certifier issues the DSAL; if not he/she gives feedback and issues the DSAL after one or more iterations
- The Passive House Consultant creates a specification sheet for all aspects that are relevant for achieving the target energy standard of the building.
- Call for tenders / contracts
 - architect/designer/contractor creates call for tenders based on specification sheet
 - Signing of contracts
- Construction works
- Completing certification
 - When the construction works are completed the Passive House Consultant provides the Certifier with information about deviations from the original design and an updated PHPP. He/she also provides the airtightness test report and the construction manager's declaration.
 - The certifier checks the updated documentation. If everything is in line with the criteria, the certifier issues the certificate.

WHO MAY ISSUE A DSAL?

A DSAL as described in this document is part of a certification process to one of the Energy Standards published by Passive House Institute. Therefore only Passive House Institute itself or a Passive House Certifier accredited by Passive House Institute may issue a DSAL.

REQUIRED PLANNING DEPTH AND EXTENT OF EXAMINATION BY THE PASSIVE HOUSE CERTIFIER

Depending on in which planning stage the certifier issues the DSAL, the depth of the information/documentation the DSAL refers to, will differ. Therefore the certifier has to note on the DSAL the planning stage, for which the DSAL is issued. The certifier needs to verify that the level of detail provided is adequate for the corresponding construction stage. In earlier planning stages more assumptions may be used for information that is not available yet (e.g. window frame product not specified yet). The certifier needs to check and approve that these assumptions are conservative enough (e.g. heat losses through thermal bridges).

The documentation Passive House consultant has to provide to the Certifier is described in the document "Criteria for the Passive House, EnerPHit and PHI low Energy Building Standards". As written above, in earlier planning stages some of the information required will be delivered as mere assumptions that need to be substantiated with further evidence at a later stage.

For the DSA the certifier examines all information that is relevant for the PHPP calculation available at that point of time and checks if the documentation corresponds to the information entered in the PHPP.

CONTENTS OF THE DSAL

The DSAL must at least include the following items, preferably in the same order as here:

- letterhead and company logo of the certifier
- name and location of the construction/renovation project
- short description of the building, including...
 - building type
 - building use
 - distinctive features
 - etc.
- the target energy standard (Passive House, EnerPHit, or PHI Low Energy Building)
- version numbers of PHPP and certification criteria used for the project, as well as a reference to the Passive House Institute as issuer of the standard
- names, company logos (optional) and contact information, of...
 - Building owner
 - architect/designer
 - Passive House Consultant
 - Passive House Certifier
- list of all documents provided for the DSA and checked by the certifier
 - ...or alternatively: reference to the zip archive on the certification platform
- information in which planning stage the DSAL has been issued (and the related planning depth verified for the DSAL)
- notes about critical points or uncertain assumption that may compromise the certification if not taken care of
- A confirmation that the project will meet the target standard, if all planning aspects relevant for this will be realized in compliance with the documentation that the certifier has received
- place and date of issue
- signature of the certifier
- a copy of the central results sheet of the PHPP (Verification sheet without signature) with the preliminary characteristic values of the building showing that the criteria are fulfilled.

DSAL: DESIGN, LAYOUT, TEMPLATES, SEALS

PHI provides a MS Word template file for the DSAL that all certifiers can use. The DSA is rather a letter than a certificate. Certifiers may use their own company letter design / letterheads. Depending on the necessary information for a given project, the DSAL will usually have two or more pages.

The DSAL is a bipartisan document between the Certifier and the certification client. Passive House Institute is not directly involved in specific DSALs issued by an accredited certifier, other than setting the general guidelines for DSALs. Therefore neither the Passive House Institutes company logo, nor any of Passive House Institute's seals may be shown on the DSAL. As the DSA is only a check at planning stage, no certification seal may be shown on the DSAL.

Currently it is considered to add a simple symbol, e.g. similar to a stamp with the text "approved design" or "approved energy efficiency design" (see concept version below). This would make the DSA visually more attractive.



Figure 1 Draft version of a stamp-like „approved design“ symbol to be put on the DSAL

DOCUMENTATION OF THE PLANNING STATE AT THE TIME OF DSA

The Passive House consultant will normally upload all documentation and the PHPP to the Passive House Institute's certification platform. On the platform the certifier can create a zip archive of the current state including all files and communication. This file gives a snapshot of the state at the time of the DSA. The file can be downloaded and then uploaded again to the DSA section of the platform where it will be saved permanently. This storage location can be referenced from the DSAL.

Before creating the zip file it is important that the Passive House consultants marks as "obsolete" all outdated documents that do not show the current state of planning. Otherwise there can be uncertainty which documents are relevant for the DSA.

The use of the certification platform is not obligatory for accredited certifiers. If a project does not use the platform, all documents relevant for the DSA with their corresponding dates must be listed individually in the DSAL.

ROLE OF PASSIVE HOUSE INSTITUTE AS PROVIDER OF THE CERTIFICATION SCHEME

PHI provides the energy standards and the formal structure, materials and support necessary for certification. However, as written above the DSAL is a bipartisan document between the certifier and the certification client. The certifier does not need to inform Passive House Institute about issuing a DSAL and does also not need to provide a copy to PHI.

CONSTRUCTION TYPES AND ENERGY STANDARDS

In the outPHit project the DSA is developed for deep retrofits and serial renovation and is tested with the outPHit case study projects. The energy standard aimed for is generally the EnerPHit standard, Passive House Institute's standard for building retrofit with Passive House components.

However the same process can also be applied to new buildings, aiming for Passive House standard (or for PHI's fall-back standard "PHI Low Energy Building"). Thus the DSA process and the DSAL can also be used for new constructions.

For retrofits to the EnerPHit standard as well as for new-built Passive Houses all three certification classes "Classic", "Plus" and "Premium" can be used. The classes express how efficiently the building uses renewable energy as well as how much renewable energy it produces.

BUILDING USES

The DSA process can basically be applied to any building use that can be certified under one of Passive House Institute's building standards, i.e. buildings uses for which PHI offers certification criteria. This covers the most common building uses like residential, office, educational etc. For some more special building uses like indoor swimming pools or hospitals PHI may develop project specific criteria upon request.

HOW ARE SUBSEQUENT CHANGES TRACKED IN THE DSAL?

The DSAL is a snapshot of the planning stage at which it has been issued. This is explicitly stated on the DSAL. Therefore it is generally not required to update the DSAL during the further planning process. However in some cases this might be helpful or necessary:

- if a funding authority requires DSALs at more than one point of time during the planning process
- as a service for the building owner or designer, giving additional security that the desired energy standard will be achieved.

In this case the certifier will check all updated or new documents and the updated PHPP and will issue a new DSAL that again states the current planning stage.

COSTS

The DSA process is part of the certification process under Passive House Institute's building certification standards. In principle no extra checks are needed for the design stage approval that wouldn't have to be done in a certification process without DSA. The DSAL is only a written approval that confirms that the planning at a certain stage is in line with the target energy standard.

However, checks might be necessary at an earlier planning stage, at which the certifier would normally not have done a check. Then more checks are necessary at later planning stages to confirm the more detailed and substantiated information available. This can mean some extra work for the certifier which might result in a slightly higher certification price.

PHI does not specify how much accredited certifiers should charge for certification. The certifier decides this independently based on the expected work load. So the question, if there is an added cost for the DSAL, depends on how many checks at which planning

stages the certifier would do anyway. In most cases no additional checks should be necessary. In this case the additional costs for the DSA would be marginal.

USING CERTIFIED SERIAL RENOVATION SYSTEMS

A certified renovation system fulfils the component requirements of component quality certification path to the EnerPHit standard. Moreover the energy characteristics for use in the PHPP are already known as well as the thermal bridge heat losses (psi-value) for typical connection details. This makes the work much easier for the parties involved in certification.

If a certified serial renovation system is used for a number of similar buildings the DSA process and DSAL might only be necessary for the first building and may be omitted for the rest of the buildings if there is no third party requiring it e.g. a funding authority.

ANNEX I:

DESIGN STAGE APPROVAL LETTER - TEMPLATE

PHI provides a MS Word template file for the DSAL that all certifiers can use. The DSA is rather a letter than a certificate. Certifiers may use their own company letter design / letterheads. Depending on the necessary information for a given project, the DSAL will usually have two or more pages.

The DSAL is a bipartisan document between the Certifier and the certification client. Passive House Institute is not directly involved in specific DSALs issued by an accredited certifier, other than setting the general guidelines for DSALs. Therefore neither the Passive House Institutes company logo, nor any of Passive House Institute's seals may be shown on the DSAL. As the DSA is only a check at planning stage, no certification seal may be shown on the DSAL.

Currently it is considered to add a simple symbol, e.g. similar to a stamp with the text "approved design" or "approved energy efficiency design" (see concept version below). This would make the DSA visually more attractive.



Please note: The below text should be copied into a new document using the certifier's letterhead and corporate design.

Certifier's letterhead and logo

Design Stage Approval Letter

project name and location

short description of the building, including building type, building use, distinctive features, etc.

Planning stage: before call for tenders

Target energy standard: EnerPHit Plus

Criteria version: 10 b of the "Criteria for the Passive House, EnerPHit and PHI low Energy Building Standards" issued by Passive House Institute

Software version: 10.2 EN of the Passive House Planning Package (PHPP) published by Passive House Institute

building owner name adress website	architect/designer name adress website
Passive House consultant name adress website	Passive House Certifier name adress website

Documentation:

Zip archive of the project on the Passive House Institute’s Certification Platform:

- Created: MM DD YYYY
- file name: XXXXXXXX.zip

[or alternatively list all documents here with corresponding dates]

Critical points or uncertain assumptions:

Note any critical points here that may compromise the certification if not taken care of

I hereby confirm that this project will meet the target energy standard, if all planning aspects relevant for this will be realized in compliance with the above-mentioned documentation and if the critical points or uncertain assumptions are taken care of.

issued by: name of certifier

XXX MM DD YYYY

XXXXXXXXXXXXXXXX

place and date

signature

Annex: Copy of the PHPP “Verification” sheet

ANNEX II:

COUNTRY SPECIFIC REQUIREMENTS FOR DSA APPROACHES

FRANCE

HISTORY OF DESIGN STAGE APPROVAL IN FRANCE

02/2007 : start association "Maison Passive France »

2009: Certification Passivhaus started in France with terraced houses in Formeries.

2012: 30 % of Certification projects after certification work is done, remain unpaid

- First action is to ask for a deposit/advance payment before starting the work
- Reduces drastically the amount of unpaid certification
- Nevertheless many criticisms for not certifying projects

2013: start of "two steps" certification: one step after Design Stage, second step after Realisation stage. First "Rapport intermédiaire"

- Very slowly at the beginning
- Only for non-experts (experts = teams with already a certified building)
- Criticism. (we don't need two steps, we're experts. One step is better)

2015: EuroPHit & new certification: EnerPHit, Passive Classic, Plus & Premium

2017: 10 years of Passivhaus in France

- Lots of uncertainty
- PHPP 9
- More public contracting authorities asking for a report at the end of design phase, because it complies with "loi MOP (maîtrise d'ouvrage public)" (https://fr.wikipedia.org/wiki/Loi_relative_%C3%A0_la_ma%C3%A9trise_d%27ouvrage_public_et_%C3%A0_ses_rapports_avec_la_ma%C3%A9trise_d%27%C5%93uvre_priv%C3%A9e)
- This law is mandatory for public work but is respected by private contractors as well: The second step starts with the "Tender for Realisation" which could be fairly different from "Design phase tenders"
- Most projects "two steps certification" by now

2020: the "two steps certification" is the only way practised in France by "PHI certifiers", because it's needed by the market and welcomed by engineering offices and buildings owners

- Asked data remains the same than "PHI"-certification

- Differences between offers based on the numbers of “interim reports”
- Differences based on the size of the “interim reports”
 - o smaller at beginning but highly awaited
 - o bigger in between, but with which data? (project data or penalizing data when there’s no data?)
 - o very thick at the end, help precise the final certificate

RÉSUMÉ:

This “two steps certification” was the key for developing Passivhaus Certification in a country at odds with “certification” because HQE and other certifications in France (LEADS, BREAM) cost a lot of money and are no assurance for a better project.

The “two steps certification” (with design stage approval if needed) was developed at the beginning to be a pedagogic certification. And it helped to develop better projects. Nowadays “Passive House certification” has established to be a real market added value.

The “Multi steps certification” has been tested on large projects because of the large numbers of actors and the need for the building developer to get a non-biased single feedback

The design stage approval has been asked for in the time between 2015-2019. For the time being it’s more the “interim report” (with IPCC scenarios) which is asked for.

NETHERLANDS

In the Netherlands, the PassiefBouwenKeur® has existed since 2006 and is awarded when a building meets the Passive House minimum requirements by the Passive House Foundation the Netherlands (PHFNL). PassiefBouwenKeur® has been extended for the Dutch market with extra building site inspections, including thermographic research, for better assurance towards the client and user.

Practice shows that the environmental permit serves as a basis for the implementation design and elaboration of the principle details also depends on the choice of the builder. It rarely happens that a building, as it is submitted in the environmental permit, is also executed exactly as it is, simply because not all choices have been made yet. That is why the second phase, 'built according to the PassiefBouwenKeur', is a very important aspect in the certification process. In this trajectory, all thermal bridges are calculated, and all data are processed in the calculations and drawings.

BUILDING SITE VISITS

The International Passive House Criteria does not foresee an on-site check of the construction or renovation site, thereby site-visits are not part of the certification procedure. However, according to PassiefBouwenKeur®, several building site visits are mandatory, for a house at least 2 and for a larger building several building site visits. The reason for this is that the precise execution of a Passive building makes interim and final inspections necessary to guarantee that a Passive building meets the strict minimum requirements. Only then is there a Passive building and can the full certificate be issued. The building site inspections may be carried out by a Passive House designer or an independent accredited consultancy. Lately, the Passive house certifier is preferred, because he can immediately check the building and pay attention to issues that he noticed at an earlier stage.

TWO PARTS, TOGETHER ONE CERTIFICATE

The PassiefBouwenKeur® certificate is issued in two phases. The first phase is the design phase. In this stage the efficiency design is tested by the consultant/architect based on the drawings from the environmental permit and whether this design meets the requirements of the PassiefBouwenKeur® as drawn up by the foundation.

Once it has been determined that the design is in accordance with the passive house standard, the design stage approval letter is issued. This certificate only states that the design complies with the passive house standard, it says nothing about the building in its not yet realized final state.

If the building is constructed and all the international requirements* are met and the intermediate building inspections have been completed and delivered, the sub-certificate 2 is issued and the certification is completed.

*/To guarantee a comfortable indoor climate and energy consumption, requirements are set for the quality of the air permeability of the building envelope, as well as for thermal insulation of the building envelope, water-side adjustment of the floor heating and correct adjustment of the air flow rates in the ventilation system.

PART-CERTIFICATE I: DESIGN ACCORDING TO PASSIVEBUILDING KEUR®

The procedure for issuing Part Certificate I of the PassiefBouwenKeur® ("the design certificate") is described below. This is the Dutch version of design stage approval.

If the design of a new building or renovation project is completely in accordance with the rules of the passive house standard and all requirements have been met, the sub-certificate I 'designed according to PassiefBouwenKeur®' can be issued. The following documents must be submitted for the issuing of Subcertificate I:

Passive House Planning Package (PHPP).

Fully completed PHPP (.xlsx file) calculation based on the submitted documents in the most current PHPP version and in case of renovation the EnerPHit Retrofit Plan.

Environmental permit documents:

Floor plans, sections, location, height above sea level (AHN-viewer) and photos of the location, the plants and the surroundings. Technical specifications of all materials of the thermal shell, including clear drawings on which the various surfaces are calculated, including the treated floor area, the net building volume for the blower door test. In addition, relevant information on the shading of the building.

Detailing:

Principal details in accordance with the submitted environmental permit with information about the applied materials. Marking and explanation of the applied thermal bridges with the corresponding psi values.

Windows and doors:

Window sheet with technical specifications and location of window frames, glass, exterior doors, and skylights corresponding to the floor plans, sections and views.

Shading:

Situation drawing of the surroundings regarding (expected) buildings and other obstructions for the purpose of shadow calculations. All other data which are necessary to calculate the shading factors, including obstructions on the side (day side) of the wall opening outside of door / window frame, overhang, surroundings, one-sided obstruction etc.

Ventilation:

The ventilation concept, with technical drawings and specifications (pressure losses) of the air ventilation system with the ventilation flow calculation.

Heating, cooling and sanitation:

Description, technical drawings and dimensioning of the heating/cooling/tap water preparation system.

Household energy:

Information about the systems applied in connection with the calculation of the primary energy demand.

Renewable energy:

If applicable, information on energy generation.

With this, the project is officially registered, and the formal start is made to realize a PassiefBouwenKeur® certified building. The design certificate is a reward for the ambition of the client/building team and the work that has been done to design a passive building. The design certificate is issued based on documents submitted by a qualified consultant.

Dutch design stage approval:

- PHPP by a certified passivehouse consultant or designer
- Primarily a stimulation and reward for the house owner
- No guarantees or lower risk
- A good start for the building team for the second phase...

PARTIAL CERTIFICATE II: CONSTRUCTION ACCORDING TO PASSIEFBOUWEN KEUR®

After completion of the building, all data must be uploaded on the certification platform of the Passive House Institute and the accredited certifier will start checking the documents. These include the packing slips of critical components (such as the glass), blower door test reports, ventilation flow measurements, infrared checks and reports of the intermediate inspections. After assessment and verification of the correctness of this data, the issuing of certificate II "built according to" PassiefBouwenKeur® will take place. This certificate is following the requirements of the International Passive House Criteria, as published by the Passive House Institute (PHI).

In addition to this international criteria, in order to obtain the PassiefBouwenKeur Certification, the design or site supervision teams are also asked to deliver at least two building site inspections (depending on the size of the building) and a thermographic report.

The international Criteria for Passive House Buildings by the Passive House Institute can be downloaded in English or German, with the German language version being decisive in case of differences in interpretation (https://passivehouse.com/03_certification/02_certification_buildings/08_energy_standards/08_energy_standards.html).

All buildings with a successfully completed PassiefBouwenKeur Certificate are included in the national and International Passive House Project database (<https://passivehouse-database.org/index.php?lang=en>).