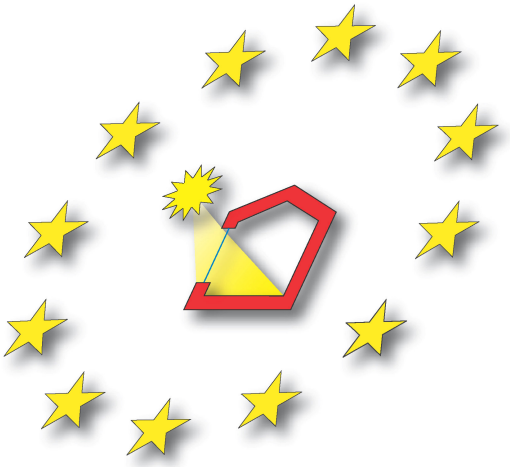

PEP

Promotion of European Passive Houses

WP 3.8 Passive House Components Certification

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The PEP Consortium consists of the following beneficiaries:

Energy research Center of the Netherlands	ECN		The Netherlands	Coordinator
Arbeitsgeneinschaft ERNEUERBARE ENERGIE Institute for Sustainable Technologies	AAE INTEC		Austria	Associated beneficiary
Building Research Establishment	BRE		United Kingdom	Associated beneficiary
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PassivHaus Institut	PHI		Germany	Subcontractor of proKlima
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Polish Passive House	PPH		Poland	Observer

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Executive summary

The report sets out the approach for the PEP Partners to the certification of products and technologies used in Passive House designs.

The report reviews the benefits of certification of the products, materials and technologies used in Passive House designs and identifies windows and glazed facades, exterior doors and heat recovery ventilation units as those for which certification is considered most practical and beneficial.

Certification criteria for these products are then proposed along with the appropriate standards and test methods.

1 Introduction

It is well recognised than the design of a Passive House requires a holistic approach to the building design and involves far more than simply selecting appropriate components.

However, to achieve the Passive House standard high quality materials and products with high levels of performance are required. In many products the performance required exceeds that available for standard products used in current common building practice. It is therefore considered beneficial to provide a system to certify products which are suitable and to confirm that the levels of performance claimed for these products are correct.

This report reviews the benefits of certification of the products, materials and technologies used in Passive House designs.

It assesses the various products, materials and technologies that could be considered for certification and identifies those for which certification is considered most practical and beneficial.

For those products the criteria that could be used as the basis of certification are proposed along with the appropriate standards and test methods.

2 Background and description of the project

Introduction to the Passive House Standard

Buildings designed to the Passive House standard have very low heat losses so that the specific energy requirement for space heating and cooling is reduced to no more than 15 kWh per m^2 floor area per annum. This requires a well insulated and sealed building envelope with a ventilation system that can recover heat from the exhaust air. In such a building a conventional space heating system is no longer required and the small amount of space heating needed can generally be supplied via the ventilation air which is distributed throughout the building.

To achieve these low-energy targets the building design has to exceed the normal regulatory requirements for insulation and airtightness, however experience, mainly within Germany and Austria, has shown that it is possible and economic to build such houses and that they can maintain good air quality and thermal comfort throughout the year. In Europe more than 5000 dwellings have so far been constructed in accordance with these requirements.

In central Europe, a building can be considered to meet the 'Passive House Standard' if the following are achieved:

- A total energy demand for space heating and cooling of less than 15 kWh/m^2/annum[1];
- A total primary energy use (heating, cooling, hot water, household electricity) of less than 120 kWh/m^2/annum[1];
- Airtightness is such that an air change rate of less than 0.6 h^{-1} is achieved for under- or over-pressure of 50 Pa, when tested in accordance with EN 13829.

The Passive House Planning Package (PHPP) provides the means to verify that the Passive House standard can be met by a particular design. The verification requires specific data about the design, materials and components to be entered into the PHPP spreadsheets. The validity of the results from this process are of course highly dependent upon the validity of the data entered.

Introduction to third party certification

Specifying the right products and services can be a confusing process, and it is important to understand what you are getting. Sales material and technical data sheets often show the product or service in its best possible light and may not present all of the necessary data so that it is difficult to compare products and services from different suppliers. Unless backed up by third party certification, claims made and the validity of technical data is often difficult to verify. They may not answer questions about compliance with standards, durability, functionality or the reputation of the supplier. Choosing approved products and services means that a detailed scrutiny of such claims has already been carried out and that regular checks of the supplier have taken place. Good approvals are nowadays listed on the internet and are easy to find and verify.

[1] Note: The possibility of adjusting these values, to suit latitudes above 60° was agreed by the PEP partners (but no specific values were agreed). For warm climate in southern Europe the Passiv-On definition applies.

Unfortunately claims are made that can mislead the user into believing a product, system or service has approval when in fact it does not. It is common to find phases printed on a product, packaging or marketing material such as "*designed to …..*", "*complies with* ....", "*tested to* ….", "*meets EN xxxx*." or even just "*EN xxxx*". Most people assume that this means the products meet this standard but this may not be the case and none of these claims are verifiable. Products may undergo testing, fail those tests and still be sold as "*tested to* ....". Using a third party list of approved products gives independent confirmation that the product did actually pass all the required tests.

Certification is third party confirmation that products, services, systems and personnel meet ***and continue to meet*** the appropriate standard. It differs from a *test* which is basically a snapshot showing that the product passed the test on a given day. Certification, through regular audits, ensures that the product continues to comply with the standard and meet the specification.

The certification process involves rigorous assessment and testing of products and services to ensure that they meet and continue to meet quality standards set by a team of experts who may be manufacturers, installers, designers, clients, regulators, insurers, engineers and scientists.

- Demonstrates compliance with relevant standards and/or regulations;
- Recognised by Building Control, specifiers, legislators and insurers etc.
- Worldwide marketing and recognition, providing the certification brand becomes established;
- Increased sales generated through confidence in the market place;
- Possibly used to justify CE Marking, where appropriate.

Choosing the right products and services, tested and approved against the appropriate standards, will save you time and cost spent searching, assessing and selecting products and services. Responsible manufacturers and suppliers, working with approval bodies and test laboratories, will have undertaken conformity assessment and will be able to demonstrate reliable performance.

Choosing good quality products and services sends positive messages to influencers and stakeholders such as regulators, insurers, lenders, customers and suppliers. It also offers intangible benefits in terms of staff morale and visitor perception, and promotes a positive feel for the organisation. Conversely, working in or visiting a building with poorly specified products and services will reflect badly on the organisation.

Benefits of certification of Passive House products and technologies

Benefits for designers & specifiers:

- provides a list of suitable products
- all parameters are specified as required for PHPP
- verified that claimed parameters are correct
- ensures that quality is maintained

Benefits for manufacturers & suppliers:

- differentiates suitable products
- increased sales
- targets development
- maintains brand integrity

- eases market entry for new products

Existing Certification available for Passive House components

Certification of components suitable for Passive House designs is currently available in Germany from the Passivhaus Institute. This is an independent research institution founded in 1996, by Dr. Wolfgang Feist. More information about this certification can be found at www.passiv.de .

The criteria for certification proposed in this report are based heavily on the Passivhaus Institute's certification scheme, with some modifications intended to make the certification process more easily applicable by other European certification bodies.

3 Scope and Issues

What technologies / products should be covered by certification

As part of this project an assessment was made of various products materials and technologies used in Passive House designs to determine those for which it would be useful and practical to propose a certification system.

Table 1 lists the products, materials and technologies used in Passive House design, which were considered. It suggests the performance parameters that could be verified and/or controlled by the certification scheme, and in the final column discusses the practicality and benefits of applying certification and makes a recommendation based on the discussions of the PEP partners.

As a result of this assessment it was decided, in the first instance, to propose certification criteria for; windows, glazed facades, external doors and mechanical ventilation systems with heat recovery.

Table 1 Products, materials and technologies considered for certification

Element	Parameters	Discussion
Insulation materials	Thermal conductivity Durability	An accurate value for the thermal conductivity of insulation material is essential for correct modelling within PHPP. There are however many materials and different ways of using them many of which may suitable for Passive House applications in certain instances. It would therefore be difficult to manage a product certification scheme for these materials. There are also well established standards for measuring In this case it may be better to add some requirements to the certification scheme for the design process to ensure that the data is generated in accordance with the correct standard and test procedure by an accredited organisation. Requirements for the durability of the materials are generally the subject of other regulatory requirements that apply to building materials ***Recommendation:*** Insulation materials do not need to be covered within a certification scheme specifically for Passive House technologies.
Thermal bridging details	Thermal conductivity	Again an accurate value for the thermal conductivity of thermal bridges is an important input into the PHPP. However the details are likely to be specific to each design and the assurance of the quality of this data has to be part of the certification of the design process. The methodologies and conventions also differ for assessing these for different countries. Whilst it is unlikely that one off designs will apply for certification the assessment methodologies should be made clear. For mass-produced pre-fabricated designs certification of the details and insulation is considered of use when these become more common. See also mass-produced pre-fabricated building elements ***Recommendation:*** A certification scheme for thermal bridges for standard designs/pre-fabricated building elements should be considered for future developments.

Windows (and glazed facades)	Thermal transmittance Solar energy transmittance of glazing Airtightness Linear thermal transmittance of thermal bridging at boundaries Durability	Extremely high thermal performance of windows is required to meet the Passive House standard. Windows exhibiting this performance are likely to be manufactured under factory conditions and supplied ready for fitting and are therefore suitable for product certification. Accepted standards exist for determining some of the performance parameters listed. There is currently no fixed methodology for determining the Linear thermal transmittance of thermal bridging at boundaries since the result will depend upon the wall construction used. PassivHaus Institute currently certify windows, although the glazing and frames are dealt with separately. ***Recommendation:*** Windows and glazed facades are considered suitable for a certification scheme and suitable criteria should be proposed (see Section 4).
Exterior Doors	Thermal transmittance: Airtightness Linear thermal transmittance of thermal bridging at boundaries Durability	Extremely high thermal performance of doors is required to meet the Passive House standard. Doors exhibiting this performance are likely to be manufactured under factory conditions and supplied ready for fitting and are therefore suitable for product certification. Accepted standards exist for determining some of the performance parameters listed. There is currently no fixed methodology for determining the Linear thermal transmittance of thermal bridging at boundaries since the result will depend upon the wall construction used. PassivHaus Institute currently certify exterior doors. ***Recommendation:*** Exterior doors are considered suitable for a certification scheme and suitable criteria should be proposed (see Section 4.)
Ventilation systems with heat recovery	Heat recovery efficiency Electrical efficiency Leakage Acoustic performance Hygiene Anti-icing precautions Controllability Durability	Due to the high airtightness requirements of the Passive House standard it is generally necessary to have a mechanical ventilation system to maintain acceptable air quality. For a Passive House, the heat content in the exhaust air is a significant proportion of the heat losses from the building and may exceed the specific heating requirement. It is therefore necessary to recover this heat, as far as possible, with a highly efficient heat exchanger. To meet the required performance the main part of the system (excluding ducts) is likely to be manufactured under factory conditions and supplied ready for fitting and is therefore suitable for product certification. Accepted standards exist for determining some of the performance parameters listed but it is likely that other specific procedures need to be defined. PassivHaus Institute currently certify ventilation and heat recovery units. ***Recommendation:*** Heat recovery ventilation units are considered suitable for a certification scheme and suitable criteria should be proposed (see Section 4.)

Space Heating/cooling systems/Post heaters and compact service units.	Thermal efficiency Safety Durability	Traditional heating system such as boilers do not warrant certification, however Passive House specific technologies such as compact service units incorporated into ventilation systems should be considered when these become more common. ***Recommendation:*** A certification scheme for compact service units should be considered for future developments.
Domestic Hot Water systems	Thermal efficiency Safety Durability	***Recommendation:*** No requirement – already covered by national requirements and there are no requirements specific to meeting the Passive House requirements.
Renewable/low carbon energy systems	Efficiency Safety Durability	***Recommendation:*** No requirement – these technologies are commonly integrated in to Passive House dwellings, however they are not specific to meeting the Passive House requirements.
High efficiency lighting	Electrical efficiency (lm/W) Durability	***Recommendation:*** No requirement – already covered by European energy efficiency labelling
Energy-saving household appliances (white goods)	Energy efficiency	The use of efficient household appliances is likely to be crucial to meeting the primary energy requirements of the Passive House standard. However, the EU already operates a compulsory labelling scheme for household appliances that allows consumers to clearly see the efficiency and energy consumption of a product. A specific Passive House certification scheme for these products is not considered necessary. ***Recommendation:*** No requirement – already covered by European energy efficiency labelling
Mass-produced pre-fabricated building elements	Thermal conductivity Thermal conductivity of thermal bridges Airtightness Durability	Certification of the suitability of mass-produced pre-fabricated building elements is considered of use when these become more common. There are currently no agreed methodologies for such prefabricated units and it is beyond the scope of this project to develop such a methodology. ***Recommendation:*** A certification scheme for mass-produced pre-fabricated building elements should be considered for future development.

Should the certification scheme(s) be implemented at the European level or Nationally ?

The benefits of a European based scheme allowing the possibility mutual acceptance between different certification bodies was discussed. However, with the current state of the market the majority of the PEP partners considered that it is too early to implement such a system and that nationally based schemes would be more appropriate.

The possibility of implementing an identifiable Passive House mark or logo was also discussed but no agreement was reached and it is expected that the different certification bodies, who run certification schemes, will implement the certification with their own marks. However, the PassivHaus Institute (PHI) may be interested in forming partnerships with certification bodies to use the PHI logo.

4 Certification criteria

This section of the report discusses the details of the required parameters and acceptance criteria for the certification of windows and glazed facades, doors, and mechanical ventilation systems suitable for use in Passive House designs.

Windows and glazed facades:

The thermal transmittance ***U*** (W m^{-2} K^{-1}) of windows and glazed façades shall be determined and specified by calculation in accordance with EN ISO 10077 or by measurement in accordance with EN ISO 12567. The specified ***U*** value shall be less than 0,8 W m^{-2} K^{-1}. In addition the ***U*** value of both the glazing[2] and frame[3] shall be less than 0,8 W m^{-2} K^{-1}.

The total solar energy transmittance (Solar Factor) ***g*** of any glazing shall be determined and specified in accordance with EN 410. It is recommended that ***g*** > 0,5.

Air tightness of the window or facade shall be determined in accordance with EN 1026 and classified in accordance with EN 12207. The overall classification and the classification based on joint length shall be Class 3 or 4 (i.e. air permeability at 100 Pa ≤ 2,25 m^3 h^{-1} m^{-1}).

Exterior doors:

The thermal transmittance ***U*** (W/(m^2 K)) exterior doors shall be determined and specified by calculation in accordance with EN ISO 10077 or by measurement in accordance with EN ISO 12567. The specified ***U*** value shall be less than 0,8 W/(m^2 K)

The total solar energy transmittance (Solar Factor) ***g*** of any glazing shall be determined and specified in accordance with EN 410. It is recommended that ***g*** > 0,5.

Air tightness of the exterior door shall be determined in accordance with EN 1026 under the environmental conditions specified in Table 2 and classified in accordance with EN 12207. The overall classification and the classification based on joint length shall be Class 3 or 4 (i.e. air permeability at 100 Pa ≤ 2,25 m^3 h^{-1} m^{-1}).

Table 2 Environmental conditions for airtightness tests

Standard Reference	Interior side		Exterior side	
	Air Temperature θ_1 (°C)	Humidity φ_1 (% RH)	Air Temperature θ_2 (°C)	Humidity φ_2 (% RH)
EN 1026	10 to 30	25 to 75	10 to 30	25 to 75
EN 1121 Climate c*	23 ± 2	30 ± 5	3 ± 2	85 ± 5
EN 1121 Climate d	23 ± 2	30 ± 5	-15 2	N/R
EN 1121 Climate e†	20 to 30	N/R	θ_1 + (55 ± 5) ‡	N/R

* Only required for wooden doors

† Exterior side heated by infrared radiation as described in EN 1121

‡ Average temperature on reference surfaces as described in EN 1121

N/R No requirement specified

[2] The ***U*** value of the glazing shall be calculated using EN 673 or measured in accordance with EN 674 or EN 675.

[3] The ***U*** value of the frame shall be calculated using EN ISO 10077-2 or measured in accordance with EN 12412-2.

Heat recovery ventilation systems

Individual whole house heat recovery ventilation units shall meet the following requirements (N.B. This does not cover Compact service units):

Thermal Efficiency:

The efficiency of sensible heat recovery (i.e. without condensation) shall exceed 75% for the nominal range of flow rates specified for the unit when measured in terms of the supply-air side temperature ratio as described in EN 13141-7.

Electrical Efficiency:

The total electrical power consumption[4] of the unit shall ≤ 0,45 W m^{-3} h^{-1} when the effective power input is measured as described in EN 13141-7 and is compared with the airflow rates delivered at the operating points tested.

It is recommended that the certification should also include the following, however the specific requirements may be changed to suit different national schemes:

Air Leakage:

The internal and external leakage, measured as described EN 13141-7, shall be ≤ 3% of the nominal maximum airflow specified for the unit.

Functional requirements:

The unit shall be provided with a suitable means to balance the supply-air and extract-air mass flow rates to within 10% of each other.

The unit shall provide user controls that allow:

- the unit to be switched off. Any standby power consumption in the off mode shall be ≤1 W;
- the unit to operate in the standard (or normal) ventilation mode;
- the unit to be operated in a basic ventilation mode with the supply and extract air flows reduced to 70 to 80 % of those in the standard ventilation mode;
- the unit to be operated in a boost (or enhanced) ventilation mode with the supply and extract air flows increased to 130% of those in the standard ventilation mode.

After a power failure to the unit, restoration of the power supply shall cause the unit to operate in the mode selected before the failure or the standard mode, without user intervention.

The unit shall be equipped with user replaceable air filters, at the ambient-air and extract-air inlets to the unit, to protect the building air quality and the heat exchanger from fouling. The ambient-air filter shall have a classification of at least F7, in accordance with EN 779, and the exhaust-air filter shall have a classification of at least G4, in accordance with EN 779.

Technical Data

The manufacturer or supplier shall provide sufficient technical data on any additional equipment required (e.g. supply-air heater or sub soil heat exchanger) to achieve a minimum supply-air temperature of 16,5°C with an ambient (outside) air temperature of -10°C.

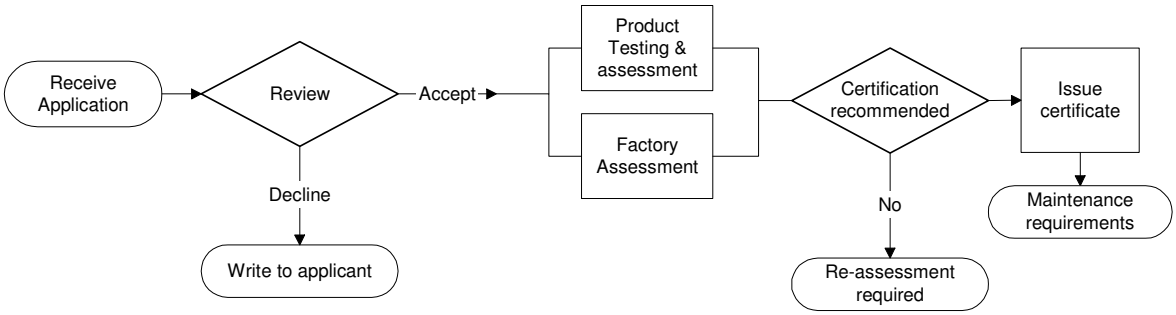
[4] excludes any heater loads (e.g. anti-icing heaters)

The manufacturer or supplier shall provide acoustic data, measured as described in EN 13141-7 for the noise radiated through the casing of the unit and from the duct connections, at the maximum of the nominal air-flow range. This shall be accompanied by sufficient technical data on the means to limit the sound pressure levels to < 25 dB(A) in living rooms to < 35 dB(A) in the plant room containing the unit and to < 30 dB(A), in other rooms.

The manufacturer or supplier shall provide sufficient technical data on the means (e.g. anti-icing heater) required to protect the unit's heat exchanger and any down stream hydraulic heat exchanger from freezing under operation of the unit with an ambient (outside) air temperature of -15°C.

5 Scheme outline and procedures

This section outlines the certification processes needed as summarised in the following flow chart. It is recommended that in order to obtain wide acceptance the certification body operating the scheme should be accredited in accordance with EN 45011 to operate the scheme:



1. Application / review

Applicants must complete application forms which are designed to capture as much information as possible about the product in order that a quotation for testing and certification can be developed. The application should be reviewed to determine if the product is suitable for certification (e.g. within the scope of the certification) and that all of the relevant data has been supplied. At this stage the costs of the certification should also be agreed with the applicant

2. Product testing / assessment

Product(s) must be tested to the requirements of the standards or specifications required to confirm that the certification criteria are met. Testing should where possible be carried out by a facility which is accredited for the work by a suitable accreditation body (e.g. a member of the European co-operation for Accreditation (EA)) or be assessed and found acceptable to the certification body

Upon completion of testing, the certification body reviews the test report to ensure that all of the requirements have been met. Where product testing is not satisfactory additional testing or a re-application may be necessary.

3. Factory assessment visits

As part of the product certification and technical approval process, assessments are usually undertaken at the factory/manufacturing locations detailed on the application form to review the processes, materials and procedures that are used to produce the end product to ensure that there is a high probability that the products produced and released to the market will also meet the certification criteria. The duration of a Factory assessment is dependant upon the number of products to be assessed and the size and location of the facility.

4. Certification recommendation / issue of certificate

A product certificate is awarded once all assessment and product testing, verification and review activities are satisfactory and any non-conformities identified in the process have been "closed out".

5. Maintenance of Certification

Product certificates are usually maintained and held in force through surveillance assessment visits to the manufacturing facilities, the completion of agreed product audit testing or assessments and the assessment of any modifications made to the product. Modifications to the product may require additional testing to be conducted to confirm continued compliance with the applicable criteria.

6 Conclusions and recommendations

The benefits of providing certification of the products and technologies used in Passive House designs have been debated by the PEP Partners during a number of meetings. It was suggested that this type of certification is not absolutely necessary for the successful realisation of a building meeting Passive House requirements and that since the Passive House design requirements allow great flexibility in the architectural solutions possible it would not be beneficial to insist that only certified products should be used. It was, however, identified that for the types of products identified below the provision of voluntary certification schemes would have benefits for all parties concerned

The various products and technologies used in Passive House designs have been reviewed and the PEP partners have proposed that windows and glazed facades, exterior doors and mechanical ventilation systems with heat recovery should be considered for certification schemes in the first instance. They have also identified that at a later stage it would also be beneficial to develop schemes for mass produced prefabricated building elements and for compact service units.

The criteria for the certification of windows and glazed facades, exterior doors and heat recovery ventilation systems are proposed along with the standards and test methods. These proposals are based heavily on the certification scheme operated by the PassivHaus Institute in Germany, modified as proposed by the PEP Partners and to make the certification process more easily applicable by other European certification bodies.

It is intended that the certification schemes set out in this report, if adopted, would allow any certification body with an interest in certification of components required for Passive House dwellings to gain accreditation for these activities. This will provide an open market for certification services and competition.

7 References

PHPP (2004) *PassivHaus Planning Package – PHPP (2004) Technical information PHI-2004/1(E) – Specifications for Quality approved Passive Houses*. PassivHaus Institute, Darmstadt.

EN 410:1998 *Glass in building – Determination of luminous and solar characteristics of glazing*. European Committee for Standardisation, Brussels.

EN 673:1998 *Glass in building. Determination of thermal transmittance (U value). Calculation method*. European Committee for Standardisation, Brussels.

EN 674:1998 *Glass in building. Determination of thermal transmittance (value). Guarded hot plate method*. European Committee for Standardisation, Brussels.

EN 675:1998 *Glass in building. Determination of thermal transmittance (value). Heat flow meter method*. European Committee for Standardisation, Brussels.

EN 779:2002 *Particulate air filters for general ventilation. Determination of the filtration performance*. European Committee for Standardisation, Brussels.

EN 1026:2000 *Windows and doors. Air permeability. Test method*. European Committee for Standardisation, Brussels.

EN 1121:2000 *Doors. Behaviour between two different climates. Test method*. European Committee for Standardisation, Brussels.

EN 12207:2000 *Windows and doors. Air permeability. Classification*. European Committee for Standardisation, Brussels.

EN 12412-2:2003 *Thermal performance of windows, doors and shutters. Determination of thermal transmittance by hot box method. – Frames*. European Committee for Standardisation, Brussels.

EN 13141-7:2004 *Ventilation for buildings. Performance testing of components/products for residential ventilation. Performance testing of a mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for single family dwellings*. European Committee for Standardisation, Brussels.

EN 13829:2001 *Thermal performance of buildings. Determination of air permeability of buildings. Fan pressurization method*. European Committee for Standardisation, Brussels.

EN ISO 10077-1:2006 *Thermal performance of windows, doors and shutters. Calculation of thermal transmittance. General*. European Committee for Standardisation, Brussels.

EN ISO 10077-2:2003 *Thermal performance of windows, doors and shutters. Calculation of thermal transmittance. Numerical method for frames*. European Committee for Standardisation, Brussels.

EN ISO 12567-1:2000 *Thermal performance of windows and doors. Determination of thermal transmittance by hot box method. Complete windows and doors*. European Committee for Standardisation, Brussels.

EN ISO 12567-2:2005 *Thermal performance of windows and doors. Determination of thermal transmittance by hot box method. Roof windows and other projecting windows*. European Committee for Standardisation, Brussels.

Appendix A Background to Work Package 3

BRE was awarded Work Package WP3 – Passive House Concept and Technologies Certification in relation to Energy Performance Certification by the work package leader. The project was reported as item 4.2.3 on page 13 of document EIE-2003-30 titled Promotion of Passive House dwellings.

Project overview (extract from document EIE-2003-30).

Description of the work, Outcomes and Deliverables		
Activities on the national level		**Activities on the international level**
3.2 Translation Adaptation to national building technologies , standards and codes Adaptation to national methods of EPC	◄	3.1 Define criteria for certification of Passive House dwellings, based on the Passiv Haus Projektierungs Paket (English version) and EU-directive on Energy Performance Certification
		▲
	►	3.3 Evaluation and feed back (all participants)
▼		
3.4 National Passive House Certification System		
3.6 Translation Adaptation to national building technologies , standards and codes Adaptation to national methods of certification of building technologies and building products	◄	3.5 Define criteria for certification of Passive House technologies, based on the outcomes of Work package 2
		▲
	►	3.7 Evaluation and feed back (all participants)
▼		
3.8 National Passive House Technologies Certification System		

The aim of Work Package 3 is to establish an International mechanism for the certification of Passive House dwellings such that each participating Country can operate to the same certification processes and criteria. This will add credibility to the Passive House programme and help to differentiate Passive House dwellings from traditional construction.

The description of work is broken into activities on both a National and International level. On a National level the project is looking at the local conditions within participating Countries with regard to Building Regulations and the implementation of the Energy Performance of Buildings Directive. It also considers the market conditions and any existing certification and approval systems. On an International level the project is looking at developing a Passive House certification scheme that can be adopted across the participating countries allowing

for variations at a National level for location and climatic conditions.

This item, Certification of Passive House Technologies forms a part of Work Package 3 and is interlinked with the other work packages. I should incorporate the outcomes from work package 2 “Passive House Concepts and Item 3.4 Passive House Certification, which is reported separately.