

Specification

for

Assessor Training Programmes for: Building Energy Rating (BER) of New Dwellings

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1.0 Introduction

This document has been developed by the Energy Performance of Buildings Directive (EPBD) Implementation Group which comprises officials drawn from the Department of the Environment, Heritage and Local Government, the Department of Communications, Marine and Natural Resources, and Sustainable Energy Ireland (SEI). It follows a process of consultation with the national accreditation bodies, prospective training providers and industry.

This document sets out the minimum requirements that must be included in any programme in order to attain recognition by the EPBD Implementation Group and the National Accreditation Bodies as a suitable Building Energy Rating (BER) Assessor Training Programme for the purposes of individuals becoming registered BER assessors for new dwellings. Additional requirements will be set in due course for the purposes of registering BER assessors for existing dwellings.

1.1 Implementation of BER in Ireland

Article 7 of the EPBD requires that when a building is constructed, sold or rented out, the owner must provide a BER Label and Advisory Report to the prospective buyer or tenant. The [Action Plan for Implementation of the EPBD in Ireland](#) published in July 2006 (downloadable from www.sei.ie/epbd), proposes phased implementation of BER in Ireland as follows:

- **1 January 2007¹**: BER of new dwellings
- **1 July 2008**: BER of new buildings, other than dwellings
- **1 January 2009**: BER of existing dwellings and other existing buildings, when offered for sale or rental

The BER Label and Advisory Report for a building in any of the above categories may be produced by a BER assessor who is registered on the relevant national database as a BER assessor for that building category. The BER must be carried out in an independent manner. The register of assessors will form part of the national administration system. The BER label and Advisory Report databases and quality assurance (QA) functions will also form part of the administration system.

1.2 Pre-requisites for BER Assessor Registration

It is anticipated that in order to be a registered as a BER assessor for new dwellings, candidates will be required to apply to the national administration system and will be required to demonstrate that they meet the requirements specified by the EPBD Implementation Group. These requirements may include the following:

- Minimum levels of previous experience
- Signing up to a Code of Practice
- Public Liability and Professional Indemnity (PI) Insurance
- Provision of a Tax Clearance Certificate
- Attending Continuing Professional Development (CPD)
- Clearance by Garda Síochána

¹ A transitional exemption will apply to dwellings for which planning permission is applied on or before **30 June 2006** provided substantial work has been completed by **30 June 2008**.

1.3 Training Programme Pre-requisites

To be recognised as meeting this *Specification for Assessor Training Programmes for BER of New Dwellings*, a training programme must meet the following criteria:

- It must be provided by a training provider that is accredited by a National Accreditation Body (HETAC, FETAC, DIT, Universities) recognised under the National Framework of Qualifications.
- The Award on successful completion of a programme must be at least a Level 6 Special Purpose Award, issued by such a National Accreditation Body.
- On successful completion of the programme, learners must have acquired the specific learning outcomes detailed in this specification.
- The programme must include the minimum examination criteria detailed in this document.

Training providers are responsible for the design of training programmes. The duration, content and delivery of training programmes must be appropriate to the learners' needs and interests, and must enable the learners to acquire all the learning outcomes specified.

Training providers may design a specific programme to meet this specification or they may integrate the specification into other programmes subject to agreement with the relevant National Accreditation Body i.e. HETAC, FETAC, DIT, Universities.

The training provider may set prequalification requirements for entry to a particular programme; and may set different entry requirements for different programmes. As a pre-qualification for entry on the proposed dedicated BER courses, successful applicants for the BER Assessor Training Programme for new dwellings should however have an appropriate construction related qualification, at least at National Certificate Level 6 Advanced Certificate/Higher Certificate in construction studies or other cognate discipline or equivalent. Equivalence may be determined as a combination of an appropriate construction-related qualification and significant relevant experience.

2.0 Purpose of the Training Programme

On completion of an Assessor Training Programme for BER for New Dwellings, the learner will be able to undertake and provide a BER and accompanying Advisory Report for a new dwelling, for delivery to the owner or builder, and for a prospective buyer or tenant, when the dwelling is constructed, sold or rented.

Training programmes must be designed to produce competent BER assessors who will be capable of delivering this service to a consistently high standard.

3.0 General Aims

Learners who successfully complete an Assessor Training Programme for BER of New Dwellings must be able to:

- Explain key objectives and the background to the EPBD
- Demonstrate the ability to undertake limitation of CO₂ emission calculations as required by the Building Regulations (Regulation L2(a)) and as outlined in the Technical Guidance Document to the Building Regulations Part L (May 2006 Edition)
- Demonstrate the ability to accurately collect data on dwelling specifications and other characteristics that affect energy and CO₂ emissions performance and input it into the DEAP software to produce BER Labels and Advisory Reports for new dwellings
- Produce BER Labels and Advisory Reports for new dwellings
- Explain the significance, in BER terms, of varying the specifications for new dwellings

4.0 Structure of Learning Outcomes Units

The specific learning outcomes are grouped into 6 units:

- Unit 1 Building Energy Rating (BER) in Ireland
 - 1.1 Key Objectives and Background to the EPBD
 - 1.2 Building Regulations Part L and Technical Guidance Document to Part L
 - 1.3 Introduction to Dwellings Energy Assessment Procedure (DEAP)
 - 1.4 Administration System
- Unit 2 Building Construction and Lighting Assessment
- Unit 3 Building Energy Performance - Fabric and Ventilation Systems
- Unit 4 Space/Domestic Hot Water, Heating Systems and their Controls
- Unit 5 Overall Energy Performance, CO₂ emissions and BER Labels
- Unit 6 Advisory Reports for New Dwellings
 - 6.1 BER Advisory Report for New Dwellings
 - 6.2 Design Advice Opportunities

5.0 Unit 1 Building Energy Rating (BER) in Ireland

Aim The aim of this unit is that the learner gains an overall understanding of the EPBD and its associated documentation

Learners should be able to:

5.1 Background to Energy Performance of Buildings Directive

- 5.1.1 Explain the key objectives of the EPBD, as set out in Article 1
- 5.1.2 Describe what the EPBD requires in terms of BERs
- 5.1.3 Describe the process that has been adopted for implementing of the EPBD in Ireland, with a particular focus on Articles 3 to 7

- 5.1.4 Identify the appropriate legislation published to date to implement Article 7 of the EPBD in Ireland
- 5.1.5 Describe the timelines including the transitional arrangements for introducing the BER requirements for new and existing buildings
- 5.1.6 Identify the types of buildings in Ireland which require BER, on a phased basis over the period 2007-2009

5.2 Building Regulations Part L and Technical Guidance Document to Part L

- 5.2.1 Explain what is required by Building Regulations Part L
- 5.2.2 Explain how the Technical Guidance Document to Part L of the Building Regulations (TGD L) (May 2006 Edition) can be used to demonstrate compliance with Building Regulations Part L
- 5.2.3 Describe TGD L guidance on the requirements of the Building Regulations Part L as set out in Section 0 and Section 1 and relevant Appendices of TGD L
- 5.2.4 Describe how to demonstrate compliance with Part L2(a) (CO₂ Emission Limitation requirement) as set out in Section 1.1 and Appendix C of TGD L
- 5.2.5 Differentiate between Part L2(a) compliance requirements and EPBD Article 7 BER requirements
- 5.2.6 Explain the transitional arrangements as outlined in the TGD L and the Building Regulations

5.3 Background to Dwellings Energy Assessment Procedure (DEAP)

- 5.3.1 Describe the general principles of the DEAP calculation method
- 5.3.2 Explain the assumptions that are made in determining the BER
- 5.3.3 Explain the limitations and constraints that apply to DEAP calculations
- 5.3.4 Identify the dwelling features that significantly affect BER calculations
- 5.3.5 Explain the meaning of a BER to a client in terms of energy efficiency and validity

5.4 Administration System

- 5.4.1 Describe the process for registering as an official BER Assessor
- 5.4.2 Explain how the BER data is submitted to the National Administration System
- 5.4.3 Explain how the BER Label and Advisory Report is printed and issued
- 5.4.4 Explain the Quality Assurance (QA) requirements associated with the scheme
- 5.4.5 Explain the importance of documenting terms, conditions and scope of assessment in writing with the client

6.0 Unit 2 Building Construction and Lighting Assessment

Aim The aim of this unit is that the learner is proficient in interpreting and entering data relating to dimensions and construction type of the dwelling into the DEAP software

Learners should be able to:

- 6.1 Explain how to determine the number of storeys in a dwelling

- 6.2 Measure the floor area and storey heights from plans
- 6.3 Measure the floor area and storey heights from surveys
- 6.4 Explain how the following spaces should be handled in DEAP: store rooms, utility rooms, porches, draft lobbies, conservatories, open plan spaces, mezzanine floors, basements/under-crofts, flats, maisonettes pitched roofs, un-heated spaces such as garages and attics
- 6.5 Interpret house drawings and construction specifications to gather relevant information on dwelling dimensions and fabric type
- 6.6 Explain how electricity consumption for lighting is calculated in DEAP
- 6.7 Identify energy efficient lights/fittings

7.0 Unit 3 Building Energy Performance - Fabric and Ventilation Systems

Aim The aim of this unit is that the learner is proficient in the calculating ventilation and fabric heat losses and is capable of inputting this data into the DEAP software

Learners should be able to:

- 7.1 Describe how the ventilation heat loss rate is calculated in DEAP
- 7.2 Describe building features listed in DEAP that affect a dwelling's ventilation rate
- 7.3 Identify all elements listed in DEAP that affect ventilation heat loss
- 7.4 Describe the situations where a chimney can be classified as a flue for the purposes of DEAP
- 7.5 Measure the effective area of a vent
- 7.6 Describe how draught lobbies, sheltered sides and suspended wooden floors affect a BER
- 7.7 Describe how to pressure test a dwelling
- 7.8 Describe how the results from a dwelling pressure testing can effect a BER
- 7.9 Identify the type of ventilation system(s) by zones
- 7.10 Describe the differences in calculation approach between designed natural ventilation and a designed mechanical ventilation (air handling) system for a dwelling
- 7.11 Identify acceptable sources of information for mechanical ventilation systems specific power consumption
- 7.12 Identify acceptable sources of information for mechanical ventilation systems heat recovery efficiency, where applicable
- 7.13 Describe how heat losses from a dwelling are calculated
- 7.14 Identify different types of window frames/glazing
- 7.15 Demonstrate the ability to determine the size, shape and orientation for each window
- 7.16 Determine U-value and frame factor for windows and doors using both "DEAP Look Up Tables" and from the International Standards recognised in DEAP
- 7.17 Evaluate the effect of varying U-values for windows for different dwelling types using DEAP
- 7.18 Identify and recognise the building fabric and construction method for walls, floors, roofs and doors
- 7.19 Demonstrate the ability to recognise acceptable sources of information for U-value calculations

- 7.20 Calculate the U values for walls, roofs and floors for various dwelling types using “DEAP Look Up tables” and the International Standards recognised in DEAP
- 7.21 Calculate U- values for elements adjacent to unheated spaces
- 7.22 Describe how unheated spaces such as garages, stairwells, rooms in the roof, access corridors, conservatories and other large glazed areas affect a BER
- 7.23 Explain the significance of varying U-values for different building types using DEAP
- 7.24 Explain the term thermal bridging
- 7.25 Explain how thermal bridging is accounted for in DEAP
- 7.26 Define circumstances where the thermal bridging factor can be varied from the default figure
- 7.27 Describe the overall and elemental heat loss limits that are specified in TGD L
- 7.28 Demonstrate how DEAP calculates internal heat gains
- 7.29 Explain how to calculate solar heat gain and demonstrate the ability to input this information into the DEAP software
- 7.30 Explain how solar and light access factors affect the BER
- 7.31 Explain how light transmittance affects the BER
- 7.32 Explain how to calculate summertime overheating using DEAP

8.0 Unit 4 Space and Domestic Hot water Heating Systems and their Controls

Aim The aim of this unit is that the learner is proficient in the calculating Domestic Hot Water and Space Heat demands and is capable of inputting this data into the DEAP software. The learner should also be proficient in identifying energy efficient controls for space and hot water heating systems.

Learners should be able to:

- 8.1 Identify all heating types of space and water heating systems referenced in DEAP
- 8.2 Describe how the demand/losses for Domestic Hot Water (DHW) system is calculated using DEAP methodology
- 8.3 Compare and contrast the heat losses from DHW storage and non-storage system
- 8.4 Determine water storage volumes of DHW systems
- 8.5 Identify insulation types and thickness for DHW systems
- 8.6 Demonstrate the ability to identify and recognise acceptable sources of measured data for declared cylinder losses
- 8.7 Calculate heat loss from DHW storage system
- 8.8 Calculate heat losses from group DHW heating systems
- 8.9 Calculate the heat output from a dwelling’s solar water heating system
- 8.10 Identify the advantages of solar heating in relation to BER
- 8.11 Explain when and how supplementary electric heating for DHW should be included in calculating a BER
- 8.12 Describe how the annual space heat requirement is calculated in DEAP
- 8.13 Calculate space heat requirements for different dwelling structures using DEAP
- 8.14 Describe how the mean internal temperature is calculated in DEAP
- 8.15 Differentiate between living fraction areas and the remainder of a dwelling.

- 8.16 Identify the thermal mass category for different dwelling construction types
- 8.17 Explain how thermal mass category affects the heat demand calculation
- 8.18 Demonstrate how to select appropriate thermal mass category for different dwelling constructions
- 8.19 Describe the type of heating schedule that is used in the DEAP calculation
- 8.20 Explain and demonstrate how solar gains are calculated
- 8.21 Explain and demonstrate how solar gains affect the space heating requirement calculation
- 8.22 Explain how the utilisation factor for solar gains is applied in DEAP
- 8.23 Explain the difference between the "ideal" and "actual" space heat requirement
- 8.24 Explain how the annual space heat demand is calculated
- 8.25 Identify the different types of space heating systems controls as referenced in DEAP
- 8.26 Determine the effect different types of controls have on the heating system efficiency
- 8.27 Apply the correct responsiveness categories to different space heating systems
- 8.28 Explain how the responsiveness category affects the heating system efficiency
- 8.29 Explain how the number and location of pumps and fans affects the calculation of the space heating demand
- 8.30 Explain how an underfloor heating system can affect the heating system efficiency
- 8.31 Explain how the annual fuel consumption for space and water heating is calculated for individual heating systems
- 8.32 Calculate the annual fuel consumption, CO₂ and costs for individual space and water heating systems
- 8.33 Explain the term *Seasonal Efficiency* as it relates to boilers and other heating appliances
- 8.34 Describe the acceptable sources of information for seasonal efficiencies for heating appliances
- 8.35 Demonstrate the ability to apply seasonal efficiencies for space and water heating systems using all acceptable sources of information
- 8.36 Explain rationale behind the Home-Heating Appliance Register of Performance (HARP) database
- 8.37 Explain how to update DEAP software with the most current data from the HARP database
- 8.38 Explain the theory behind efficiency adjustment factors
- 8.39 Demonstrate the ability to apply efficiency adjustment factors to space and water heating systems
- 8.40 Describe how to determine which heating system in a dwelling is the primary heating system and which is the secondary heating system
- 8.41 Demonstrate how the energy demand from the primary and secondary heating systems are apportioned
- 8.42 Identify single and dual electric immersion heaters
- 8.43 Identify fuel type for the main and secondary water and space heating systems
- 8.44 Identify the solar collector types referenced in DEAP
- 8.45 Demonstrate the ability to measure the aperture area of solar collectors
- 8.46 Demonstrate how the zero-loss collector efficiency and the collector heat loss coefficients are calculated
- 8.47 Identify the angle of tilt of a solar collector
- 8.48 Explain how varying the orientation of a solar collector affects its performance
- 8.49 Demonstrate how to apply the solar over-shading correction factor

- 8.50 Describe how the solar over-shading correction factor affects the input to the hot water heating system
- 8.51 Explain how a solar water heater affects a dwelling's water heating demand
- 8.52 Describe how the annual fuel consumption for space and water heating is calculated for community heating schemes
- 8.53 Calculate the annual fuel consumption, CO₂ and costs for space and water heating for community/group heating schemes
- 8.54 Identify the primary fuel and secondary fuel type for space heating
- 8.55 Describe how to demonstrate that the Carbon Dioxide Emission Rating (CDER) of the dwelling being assessed does not exceed that of a reference dwelling which determines the Maximum Permitted Carbon Dioxide Emission (MPCDE) from the dwelling

9.0 Unit 5 Overall Energy Performance, CO₂ emissions and BER Labels

Aim The aim of this unit is that the learner can demonstrate the ability to undertake a BER using DEAP software

Learners should be able to:

- 9.1 Use DEAP to calculate the BER in kWh/m²/annum and the CDER CO₂/m²/annum for a variety of new dwelling forms of varying complexity
- 9.2 For a variety of new dwelling forms, of varying complexity, compare the calculated CDER result with the MPCDER result
- 9.3 Determine if a dwelling is in compliance with Part L of the Building Regulations
- 9.4 Explain when assessment limitations, caveats or explanations should be included with a BER assessment
- 9.5 Demonstrate the ability to appraise and evaluate the default data contained in the DEAP software
- 9.6 Demonstrate how the BER is affected by changes in the fabric or dimensions of the building, type of space and or water heating system in use and the application of heating system controls
- 9.7 Produce BER Labels

10.0 Unit 6 Advisory Reports for New Dwellings

Aim The aim of this unit is that the learner can produce an Advisory Report which will provide information on the dwelling features, operation and maintenance requirements

Learners should be able to:

10.1 BER Advisory Report for New Dwellings

- 10.1.1 Explain the purpose of the Advisory Reports
- 10.1.2 Illustrate how to check and amend default suggestions of an Advisory Report, if allowed
- 10.1.3 Explain how a dwelling can be best managed to optimise the energy performance

- 10.1.4 Explain day to day practices effecting space heating, water heating and lighting energy use, including setting and using controls
- 10.1.5 Detail the requirements for periodic checks required on installations, annual maintenance and pre-season checks
- 10.1.6 Explain the major maintenance issues within a dwelling

10.2 Design Advice Opportunities

- 10.2.1 Explain how the DEAP software can be used to provide information on maximising a new dwelling's energy performance at the design stage
- 10.2.2 For a variety of dwelling types identify the most feasible measures to improve a new dwelling's energy performance
- 10.2.3 Evaluate the effect of fuel switching has with regard to CO₂ emissions, energy cost and efficiency
- 10.2.4 Evaluate how the delivered energy produced from renewable and energy-saving technologies affects the primary energy, CO₂ emission factors and price/unit costs for a dwelling

11.0 Examination

All examinations must be carried out in accordance with the National Accreditation Body's regulations (HETAC, FETAC, DIT, Universities).

The examination must be devised by the training provider, with external moderation by the relevant National Accreditation Body.

SEI and the National EPBD Administration System reserve the right to review and monitor the examination process.

The examination must include the following minimum criteria:

- Assignments (x3) 30% of total marks
- Examination 70% of total marks

Learners must achieve an overall mark of 70% in order to be eligible to become a registered assessor for BER in relation to new dwellings.

11.1 Assignments (30% of Total Marks)

The training providers must devise three individual assignments that require the learners to produce evidence that demonstrates an understanding and the application of the range of specific learning outcomes. The new dwellings should be of a sufficiently complex form to ensure that learners can demonstrate that they can apply DEAP to a variety of new dwelling types of varying complexity. For example in Assignment 1, elements such as dormer windows, integral garages, split level and irregular or non-standard dimensions should be included in the specification.

Assignment 1:	Unit 2 Building Construction and Lighting Assessment
Assignment 2:	Unit 3 Building Energy Performance –Fabric & Ventilation Systems
Assignment 3:	Unit 4 Space/DHW Heating Systems & their Controls

Each assignment must be presented in written/type format including the appropriate worksheets of the DEAP software.

Assignments marks must be follows;

- Assignment 1: 10%
- Assignment 2: 10%
- Assignment 3: 10%

11.2 Examination (70% of Total Marks)

Part 1: Short Answer Questions (30% of Total Marks)

The training providers must devise an examination that assesses learner ability to recall, apply theory, define information, recall and recognise data which requiring a response to a range of questions. The answers will be in written form, including any illustrations and must be categorises as short in length.

The examination must cover all Units. The format of the examination must be short questions of equal marks.

The following elements must be included in the examination:

- Calculation of U-Values for building elements
- Measurement of dimensions for non-standard dwellings
- Determination of the seasonal efficiencies of various types of heating systems
- Identification of heating control systems

Learners must attempt all questions.

Total marks assigned to Part 1 must be 30%

Part 2 Practical Examination (40% of Total Marks)

The training providers must devise a practical examination that requires learners to:

- Demonstrate their ability to use the DEAP software in a supervised setting for an unseen dwelling to produce a BER Label and Advisory Report. The practical examination must be of such depth and breath that requires the candidate to apply all aspects of the DEAP software.
- Vary the input data for the given dwelling to achieve a specified improvement in the BER. This will require the learner to vary the different type of heating controls, alternative heating systems and insulation levels.

Total marks assigned to Part 2 must be 40%