Information Sheet 2008 01

What are SAPs, EPCs and HIPs? (England and Wales)

Introduction

This information sheet is produced by a Technical Taskforce which brings together BRE, CIAT, RIBA and NBS. It aims to clarify the meaning of SAP ratings and EPCs and how they operate in practice in England and Wales.

SAP

SAP is the Government's Standard Assessment Procedure for assessing the energy performance of dwellings. The indicators of energy performance are Fabric Energy Efficiency (FEE), energy consumption per unit floor area, an energy cost rating (the SAP rating), an Environmental Impact rating based on CO_2 emissions (the EI rating) and a Dwelling CO_2 Emission Rate (DER). The SAP rating is based on the energy costs associated with space heating, water heating, ventilation and lighting, less cost savings from on-site energy generation technologies. It is adjusted for floor area so that it is essentially independent of dwelling size for a given built form. The SAP rating is expressed on a scale of 1 to 100, the higher the number the lower the running costs. The Environmental Impact rating is based on the annual CO_2 emissions associated with space heating, water heating, ventilation and lighting, less the emissions saved by energy generation technologies. It is adjusted for floor area so that it is essentially independent of dwelling size for a given built form. The Environmental Impact rating is expressed on a scale of 1 to 100, the higher the number the better the standard.

The Dwelling CO_2 Emission Rate is used for the purposes of demonstrating compliance with building regulations. It is equal to the annual CO_2 emissions per unit floor area for space heating, water heating, ventilation and lighting, less the emissions saved by energy generation technologies, expressed in kg/m²/year. The method of calculating the energy performance and the ratings is set out in the form of a published specification and worksheet, accompanied by a series of tables. The methodology is compliant with the Energy Performance of Buildings Directive. The calculation should be carried out using a computer program that implements the worksheet and is approved for SAP calculations (BRE approves SAP software on behalf of the Department for Energy and Climate Change; the Department for Communities and Local Government; the Scottish Government; the National Assembly for Wales; and the Department of Finance and Personnel in Northern Ireland).

The Standard Assessment Procedure (SAP) has been adopted by Government as the UK National Methodology for calculating the energy performance of dwellings. The calculation is based on the energy balance taking into account a range of factors that contribute to energy efficiency:

- materials used for construction of the dwelling;
- thermal insulation of the building fabric;
- air leakage and ventilation characteristics of the dwelling and ventilation equipment;
- efficiency and control of the heating system(s);
- solar gains through the fabric and openings of the dwelling;
- the fuel used to provide space and water heating, ventilation and lighting;
- energy for space cooling, if applicable;
- renewable energy technologies.

The calculation is independent of factors related to the individual characteristics of the household occupying the dwelling when the rating is calculated, for example:

- household size and composition;
- ownership and efficiency of particular domestic electrical appliances;
- individual heating patterns and temperatures.

Except where the dwelling has a fixed air conditioning system, ratings are not affected by the geographical location. The procedure used for the calculation is based on the BRE Domestic Energy Model (BREDEM), which provides a framework for the calculation of energy use in dwellings. The procedure is consistent with the standard BS EN ISO 13790.

SAP 2012 version 9.92 (May 2013)

The Standard Assessment Procedure was first published by the then DOE and BRE in 1993 and in amended form in 1994, and conventions to be used with it were published in 1996 and amended in 1997. The present edition is SAP 2102 in which:

- The climatic data has been extended to allow calculations using regional weather;
- An allowance for height above sea level is incorporated into external temperature data;
- CO_2 emission factors have been extensively revised;
- Fuel price and primary energy factors have been revised; and
- The options for heat losses from primary pipework have been extended

Further information on SAP is available at www.bre.co.uk/sap2012 and https://www.gov.uk/guidance/standard-assessment-procedure.

EPC

EPC is an acronym for Energy Performance Certificate. There are various types of EPCs for dwellings and for non-dwellings. The EPC for existing houses offered for sale or rent is based on the RdSAP (Reduced Data Standard Assessment Procedure) calculation method, which is a streamlined version of SAP 2012 (above). It also includes suggestions for remedial works which would potentially increase the energy efficiency should they be followed.

The Government is using this method in order to address the EU Directive 2002/91/EC to reduce carbon emissions from buildings. A qualified Domestic Energy Assessor must carry out the assessment. The ratings here are A-G, A being the most energy efficient. An average rating on buildings in the UK is between D and E. The idea is that prospective buyers, tenants, owners and occupiers may view the energy efficiency and carbon emission information so that they may consider fuel costs before making an investment. EPCs are valid for 10 years.

From April 2008, EPCs are required for houses newly constructed or buildings converted to a residential structure. The SAP calculations and EPCs produced for new build properties are produced by On Construction Domestic Energy Assessors (OCDEA).The information which goes into the production of EPCs for new buildings is far more detailed than that for an existing building. All properties which are sold or rented are required to have an EPC.

For non-dwellings, there is an EPC which rates the calculated energy performance of a building based on its design and standardised operating conditions. The various types of energy consumption from occupying a building must be brought together on a common basis so that the performance of one building can be compared with that of another. The UK has decided that the common unit should be CO_2 emissions, since this is a key driver for energy policy. The EPC is produced using DCLG-approved software tools, which can be either

- The Simplified Building Energy Model (SBEM) and its default user inferface iSBEM (available free from www.ncm.bre.co.uk)
- An approved commercial interface to SBEM
- An approved dynamic simulation model.

The software rates the building from A to G, with A being very efficient.

The EPC also includes recommendations on how to improve the energy performance of the building. For new buildings, the EPC will be based upon the information from plans and specifications and for existing buildings based upon a survey of the building and services. Further information on EPCs is available at http://epc.direct.gov.uk/index.html.

DEC

For buildings with a total useful floor area over 500m^2 that are occupied in whole or part by public authorities and frequently visited by the public, there is

a separate requirement for a Display Energy Certificate (DEC) and an accompanying advisory report.

A DEC shows the energy performance of a building based on actual energy consumption as recorded over the last 12 months (the operational rating). This rating is shown on a scale from A to G, where A is the best. DECs for buildings larger than 1,000m² must also show the operational ratings for the previous two years, where available.

The operational rating is based on the amount of energy consumed during the occupation of the building over a period of 12 months from meter readings and is compared to a hypothetical building with performance equal to one typical of its type (the benchmark). The operational rating must be calculated according to the methodology approved by the Secretary of State. This is done by an accredited energy assessor using a software tool for the calculation which has been approved by the Secretary of State.
This is available here:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7806/998942.pdf

For buildings of more than 1,000m², the DEC is valid for 12 months. The advisory report is valid for seven years. Where the building is between 500m² and 1000m², the DEC and advisory report are valid for 10 years. From 9 January 2013, the occupier of a building requiring a DEC must display it in a prominent place clearly visible to the public.

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