

The history of the Building Regulations and where we are now

HBF Technical Conference: *The road to zero carbon is paved with Building Regulations*

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- History of BRs energy efficiency requirements, where we are now, and where are we going.
- The Govt agenda and way forward:
 - “Part L”
 - Code for Sustainable Homes
 - Energy Performance of Buildings Directive
- **Focussing on new dwellings**

- **1962** onwards – anti-condensation, not energy efficiency.
- **1972** Conservation of fuel and power provisions for dwellings Part F...
- **1974** Ditto non dwellings – Part FF.
- **1985** Provisions recast:-
 - Functional requirement – make reasonable provision.
 - Guidance in Approved Document L – some ways of complying.
- **1990, 1995, 2002** Requirements improved and re-focussed first on energy efficiency and then on CO₂.

Fabric insulation standards

Year	U-values (W/m ² K)				Glazing	
	Wall	Roof	Floor	Windows	Area	Draught-strip
1965	1.7	1.42	-	5.7	12% Wall	-
1974	1.0	0.60	-	5.7	12% Wall	-
1981	0.6	0.35	-	5.7	12% Wall	-
1990	0.45	0.25	0.45	5.7	15% Floor	-
1995	0.45 ¹	0.25 ¹	0.45 ¹	3.3	22.5% Floor (incl. doors)	Yes
2002	0.35 ²	0.16 ² (pitched)	0.25 ²	2.0	25% Floor (inc doors)	Yes

1 Allowing for mortar joints and roof or floor joists.

2 Calculated using average of the upper and lower resistance limits (EN ISO 6946) and allowing for wall ties etc.

Fabric insulation standards

Year	U-values (W/m ² K)				Glazing	
	Wall	Roof	Floor	Windows	Area	Draught-strip
1965	1.7	1.5	-	4.8	12% Wall	-
1974	1.1	0.68	-	4.8	12% Wall	-
1981	0.7	0.40	-	4.8	12% Wall	-
1990	0.48	0.26	0.45	4.8	15% Floor	-
1995	0.47	0.25	0.45	3.3	22.5% Floor (incl. doors)	Yes
2002	0.35	0.16 (pitched)	0.25	2.0	25% Floor (inc doors)	Yes

Allowing for mortar joints and roof or floor joists in all cases

Calculated using average of the upper and lower resistance limits (EN ISO 6946) and allowing for wall ties etc.

- Compliance no longer by elemental route – EPBD.
- Whole building performance- Limit on CO₂ emissions – NCM : SAP.
- Target set by notional building:-
 - Same size and shape, compliant with 2002 stds
 - Improvement factor = (1 - 0.2).
- Design flexibility:-
 - Various ways of achieving the improvements
 - but limits set.

- **Kyoto EU share** : 12.5% cut in CO₂ from 1990 level by 2008-2012.
- **UK national target** to reduce CO₂ by 20% by 2010; between 26-32% by 2020; and aspiration of 60% by 2050.
- **Climate Change Bill** – when enacted:-
 - establishes 2020 and 2050 goals as legal targets.
 - sets 5-year “budgets” for emissions.
 - establishes advisory Climate Change Committee.
 - Enables legal challenge on failure to meet targets.
- **New EU targets for 2020:-**

- The Climate change agenda for homes is supported by:-
 - Bldg Regs Part L etc amendments.
 - Code for Sustainable Homes and detailed technical guidance.
 - Energy Performance of Buildings Directive and Energy Performance Certificates.
 - (Moves in planning legislation).

Proposed standards 2010 and beyond

- From the base set by the 2006 amendment:-
 - 25% better in 2010 (40% better than 2002).
 - 44% better in 2013 (55% better than 2002).
 - Consult on both of these in 2009.
- Zero carbon by 2016.
- Work on suitable calculation tools wef 2008.
- Gives a clear decade-long timetable which gives participants time to plan and innovate.

Part L 2010: 25% improvement Example in the Fwd Thinking Paper

Compliance package for 100m² gas heated detached house.	
Roof	Average U-value 0.14 W/m ² K, e.g. a fully filled 300 mm deep timber I-beam structure.
Walls	<p>Average U-value 0.22 W/m²K, e.g.</p> <ul style="list-style-type: none"> - a masonry wall with a 150 mm cavity fully filled with fibre insulation - overall wall thickness of 370mm - timber frame 89mm studs with around 70mm external insulation - overall wall thickness of around 350mm. - Structural concrete block walls with external insulation and render with thicknesses of around 300mm.
Ground floor	Average U-value 0.17 W/m ² K, e.g. 150 mm expanded polystyrene (EPS) or equivalent under slab insulation and edge insulation
Windows and doors	Average U-value 0.9 W/m ² K e.g. high performance triple glazed windows, with soft-coat low-e glazing, Argon fill and warm edge technology. (Note safety glazing required by the Building regulations Part N would have to be laminated rather than toughened.)
Thermal bridging allowance	0.04 W/m ² K; this is a reduction (improvement) of 50% on the current default allowance, and can be achieved through improved construction details such as separate inner and outer lintels in masonry cavity walls.

Part L 2010: 25% improvement Example in the Fwd Thinking Paper

Compliance package for 100m² gas heated detached house – cont'd	
Ventilation system	High performance mechanical extract ventilation, typically a specific fan power of 0.4 W/litre/s.
Air permeability (resistance to air leakage)	3 m ³ /hour/m ² @ 50 Pa. One way of achieving this is to parge, plaster or screed inside surfaces of walls, ceilings and floors.
Hot water central Heating	Boiler 90% (SEDBUK band A) plus thermostatic controls package - SAP control type 2
Secondary heating	10% electric
Hot water storage cylinder	High performance recovery with 75 mm insulation.
% of low energy light fittings	70%, to be provided in rooms with greatest lighting demand There are more than 320 domestic low energy light fittings on the DEELS register.
Energy Rating	Environmental Index of 75 : Band B in A to G scale.
Code for Sustainable Homes	Energy Level 3

Code for Sustainable Homes: Objectives and key features

- A single national standard for sustainable dwellings.
- Key objectives:
 - Encourage home builders.
 - Empower home buyers.
 - Signal the direction of future regulations and give certainty.

Key features:

- Nine categories of sustainability.
- ‘Whole house’ approach.
- Minimum standards ensure environmental robustness.
- Flexibility for developers.
- Star rating system – a tool for marketing.




Categories	Flexibility
Energy Efficiency Water Efficiency	Minimum Standards at each Level of the Code
Materials Surface Water Run Off Waste	Minimum Standards at Code entry level
Pollution Health & Well-Being Management Ecology	No minimum standards

The Energy Performance of Buildings Directive

- Articles 3-6 – implemented in Part L 2006
 - Art 3 : NCM - focuses on CO₂.
 - Art 4-6: Setting stds.
 - Art 4 – Use NCM to set stds.
 - Art 5 : Set stds for new buildings using NCM.
 - Art 6 : Improve larger buildings when renovating.
- Articles 7, 9 & 10 – the EPB Regulations 2007 (as amended):-
 - Art 7 : EPCs on construction, sale or let.
 - Art 9 : Regular inspection of air con systems > 12 kW.
- Art 8: (a) inspections or (b) advice:-
 - The UK is going for option (b) – see our web site for latest.

- From 1 Aug 07 (phased) in HIPs for marketed sales
 - From 6 April 08 on new build.
 - From 1 Oct 08 on rentals and non marketed sales
- Existing homes: RdSAP, DEA accreditation schemes in place
 - New homes: SAP, on-construction accreditation scheme applications now being received (closure date for applicants wanting approval this year is 23 Nov).

Energy Performance Certificate



17 Any Street,
Any Town,
County,
YY3 5XX

Dwelling type: Detached house
Date of assessment: 02 February 2007
Date of certificate: [dd mmmm yyyy]
Reference number: 0000-0000-0000-0000-0000
Total floor area: 166 m²

This home's performance is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.

Energy Efficiency Rating		Current	Potential
Very energy efficient - lower running costs			
(92-100) A			
(81-91) B			
(69-80) C			
(55-68) D			
(39-54) E			
(21-38) F			
(1-20) G			
Not energy efficient - higher running costs			
		37	73
England & Wales		EU Directive 2002/91/EC	

The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills will be.

Environmental Impact (CO ₂) Rating		Current	Potential
Very environmentally friendly - lower CO ₂ emissions			
(92-100) A			
(81-91) B			
(69-80) C			
(55-68) D			
(39-54) E			
(21-38) F			
(1-20) G			
Not environmentally friendly - higher CO ₂ emissions			
		31	69
England & Wales		EU Directive 2002/91/EC	


The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Estimated energy use, carbon dioxide (CO₂) emissions and fuel costs of this home

	Current	Potential
Energy Use	453 kWh/m ² per year	178 kWh/m ² per year
Carbon dioxide emissions	13 tonnes per year	4.9 tonnes per year
Lighting	£81 per year	£65 per year
Heating	£1173 per year	£457 per year
Hot water	£219 per year	£104 per year

Based on standardised assumptions about occupancy, heating patterns and geographical location, the above table provides an indication of how much it will cost to provide lighting, heating and hot water to this home. The fuel costs only take into account the cost of fuel and not any associated service, maintenance or safety inspection. This certificate has been provided for comparative purposes only and enables one home to be compared with another. Always check the date the certificate was issued, because fuel prices can increase over time and energy saving recommendations will evolve.

To see how this home can achieve its potential rating please see the recommended measures.



Remember to look for the energy saving recommended logo when buying energy-efficient products. It's a quick and easy way to identify the most energy-efficient products on the market.

For advice on how to take action and to find out about offers available to help make your home more energy efficient, call 0800 512 012 or visit www.energysavingtrust.org.uk/myhome

- The EU 'Energy Efficiency Action Plan' suggests further investigation of the following areas:-
 - Expanded role for public sector demonstration of new technologies and methods.
 - Lower threshold for minimum requirements for major renovations.
- Minimum performance requirements for new and renovated buildings.
- A target for new buildings approaching PassivHaus stds by 2015.
- Obligating MSs to require installation of passive heating and cooling technologies.
- Obligating MSs to provide finance for cost-effective investments.

SAP vs RdSAP – 1

What we are trying to do

- Provisions specifying when a bldg built to 2006 regs will need a HIP not yet commenced but ...
- Currently any dwelling built to pre-2006 BRs still under construction can be marketed as long as a HIP and a PEA have been commissioned.
- Under the current HIP Regs from 1 January the HIP and PEA need to be obtained before marketing (subject to the provision that allows marketing before the PEA has been obtained – the 28 day rule.
- Once the building is complete the PEA must be replaced by an EPC within 14 days of completion.

SAP vs RdSAP – 2

What we are trying to do

- The regs do not specify whether an EPC should be provided using RDSAP or SAP: this is set out in the Notice of Approval which we can amend whenever we want.
- We intend to enable SAP EPCs to be used as soon as the software is available and they can be lodged in the Register.
- We are seeking to change things so that SAP EPCs can be used for all new dwellings whatever Bldg Regs they are built to.
- **A position statement on this will be produced shortly.**



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