

Low Carbon Heating



- An Energy Efficiency Perspective

A Joint Contribution



Domestic CO2 Emissions

- 27% of total UK Carbon emissions come from the energy use of dwellings

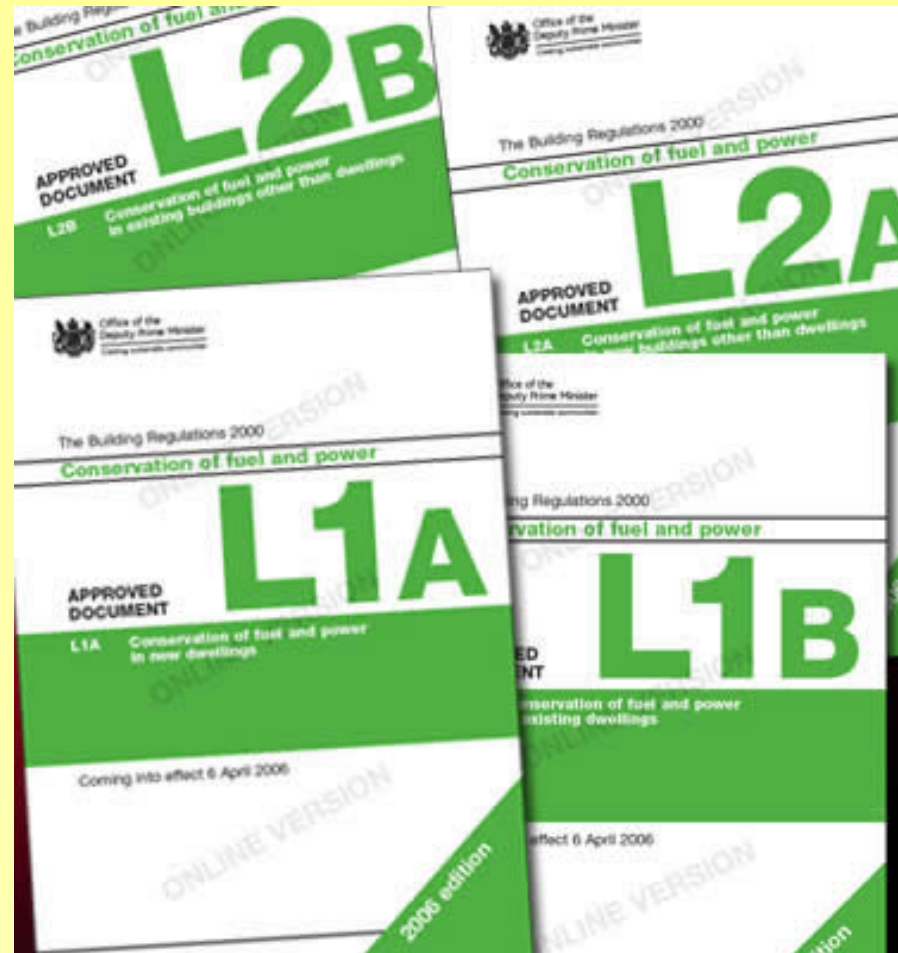


1930's House



- Total annual energy bill typically £1,030
- Total carbon emissions: 6.2 tonnes
- Space Heating 3.7 tonnes
- Hot Water 1.0 tonne
- Heating: 75% of total

Building Regulations 2006



New Build Semi-detached



- Typical annual energy bill is £590
- Total carbon emissions: 2.8 tonnes
- Space heating: 0.75 tonnes
- Hot water: 0.55 tonnes
- Heating 50% of total

2017 Government Target

- All new-build homes to be carbon neutral

Energy Saving Trust Standards



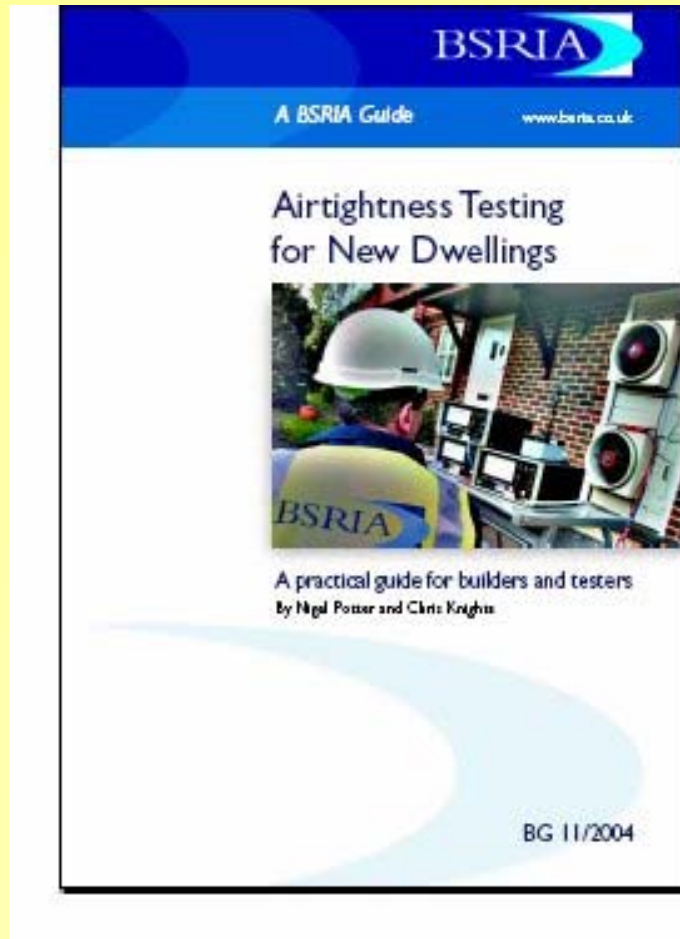
- Good Practice is the TER x 0.9
- Best Practice is the TER x 0.75
- Advanced Practice is TER x 0.4

Heating Improvements

- More flexible programmer
- Separate time zones
- Sophisticated room thermostats
- Weather compensation control
- More efficient secondary heating

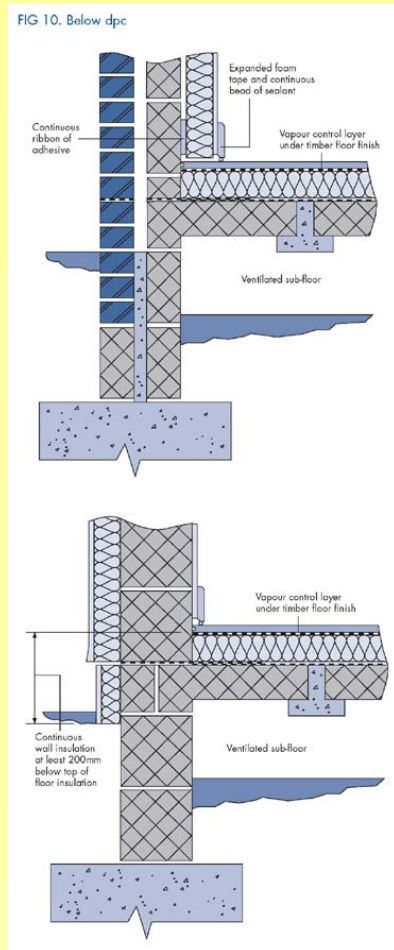


Air Permeability



- Reduce current standard from 12 m³/(hm²) @50 Pa to 3 m³/(hm²) @ 50 Pa (Swedish standard since 1977)
- This will necessitate the installation of MVHR

Reduce Thermal Bridging



- Take greater care to avoid thermal bridging during both the design and build of new homes

Improve Insulation

- Walls: Install 150mm fully-filled MF CWI
- Roof: Install 350mm of MF Loft Insulation
- Floor: Use 100mm of Polyurethane insulation
- Windows: Super low-E Argon filled DG
- Doors: Install insulated doors (U-value of 1.0)

Incorporate Best Practice

- The overall carbon emissions will drop from 2.8 tonnes to 2.2
- Space heating will reduce from 0.75 to 0.15
- Hot water will remain unchanged at 0.55 tonnes
- Total heating emissions will be reduced by 0.6 tonnes per year

Measure	Cost (£)	Annual CO2 (T)	Lifetime CO2 (T)	£ per tonne
Bridging	205	0.092	5.52	37
Insulation	785	0.226	13.560	58
Best Practice	4,294	0.705	23.634	182
Wood Boiler	5,000	1.042	15.630	320
Heating	450	0.082	1.23	366
Advanced P	13,750	1.84	37.5	365
Airtightness	1,079	0.086	2.580	418
Solar Water	2,500	0.275	4.125	606
P.V. arrays (28m ²)	20,000	1.431	21.470	932
400W Wind	1,500	0.150	1.2	1,250