Approved Document L - Conservation of fuel and power

Volume 1: dwellings

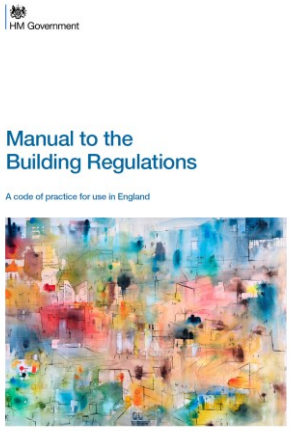
Consultation version – January 2021

This draft guidance accompanies the January 2021 consultation on *The Future Buildings Standard: Consultation on changes to Part L (conservation of fuel and power) and Part F (ventilation) of the Building Regulations for non-domestic buildings and dwellings; and overheating in new residential buildings*. The Government is primarily seeking views on the standards for work to existing dwellings, and the structure of the draft guidance.

Background

How is construction regulated in England?

The Manual to the Building Regulations gives an overview of the building regulatory system in England. You can access the most recent version of the manual here.



How do you comply with the Building Regulations?

The Building Regulations are made under powers provided in the Building Act 1984. This applies in England and Wales. The majority of building projects are required to comply with them. They exist to ensure the health and safety of people in and around all types of buildings (i.e. domestic, commercial and industrial). They also provide for energy conservation, and access to and use of buildings.

The following is a high-level summary of the Building Regulations relevant to most types of building work. Where there is any doubt you should consult the full text of the regulations, available at www.legislation.gov.uk.

Building work

Building work is a legal term used to define the scope of the Building Regulations. For further information, see Volume 1 and paragraph A14 in Volume 2 of the **Manual to the Building Regulations.**

Material change of use

Building Regulations often apply when you change the use of a building, when it is a material change of use. This is discussed in paragraphs A14, A20 and Table A2 in Volume 2 of the **Manual to the Building Regulations.**

Materials and workmanship

Regulation 7 of the Building Regulations place requirements on materials and workmanship. Chapter 7 in Volume 1 and paragraphs F8 – F11 in Volume 2 of the **Manual to the Building Regulations** provides a summary of how to meet the regulations.

Independent third-party certification and accreditation

For information about Competent Persons Schemes, see Chapter 5 in Volume 1 and Chapter C in Volume 2 of the **Manual to the Building Regulations.**

Energy efficiency requirements

More information on energy efficiency requirements of the Building Regulations is given in paragraphs A12, A14 (f), A14 (g), A14 (h) A22, A23, B2 and F24 in Volume 2 of the **Manual to the Building Regulations.**

Notification of work

It is commonly necessary to notify a building control service of the work that you are to undertake. For further information on when to notify a building control service, see Chapter B in Volume 2 of the **Manual to the Building Regulations.**

Responsibility for compliance

Those responsible for carrying out building work (for example, agents, designers, builders, installers and the building owner), must ensure that the work complies with all of the relevant requirements of the Building Regulations. For further information on this topic, see Chapter 7 in Volume 1 and paragraphs A26, B2 and F2 Volume 2 of the **Manual to the Building Regulations.**

How to use an approved document

The approved documents provide guidance to help you satisfy the Building Regulations in many common situations. Following the guidance in the approved documents does not guarantee compliance. It is important to understand, when carrying out building work, the need to meet all of the relevant requirements of the Building Regulations. For further information see Chapter 1 and Chapter 7 in Volume 1 and Chapter F in Volume 2 of the Manual to the Building Regulations.

In this consultation version of the Approved Document technical differences to the Approved Document L1B 2010 edition incorporating 2010, 2011, 2013, 2016 and 2018 amendments are generally highlighted in yellow.

Guidance for work on existing dwellings is highlighted on a blue background.

Guidance for new dwellings is provided for reference and incorporates the changes made as a result of the *Future Homes Standard* consultation. For a full explanation of policy changes since the *October 2019 Future Homes Standard Consultation* edition, please see *Future Homes Standard: Summary of Responses Received and Government Response* published alongside this document.

This text is subject to change before it becomes statutory guidance in 2021.

User requirements

The approved documents provide technical guidance. Users of the approved documents should have adequate knowledge and skills to understand and apply the guidance correctly to the building work being undertaken. Users should also understand that following the approved documents does not guarantee compliance with the Building Regulations.

Where you can get further help

If you are not confident that you possess adequate knowledge and skills to apply the guidance correctly, or if you do not understand the technical guidance or other information in this approved document or the additional detailed technical references to which it directs you, you should seek further help. Help can be obtained through a number of routes, some of which are listed below.

a. If you are the person undertaking the building work: either from your local authority building control service or from an approved inspector.

b. If you are registered with a competent person scheme: from the scheme operator.

c. If your query is technical: from a specialist or an industry technical body for the relevant subject.

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Section 0: Introduction

Summary

0.1 This approved document is **Approved Document L, volume 1: dwellings**. It gives guidance on how to comply with Part L of Schedule 1 of the Building Regulations and the associated energy efficiency requirements for dwellings. For guidance for non-domestic buildings, use **Approved Document L, volume 2: Buildings other than dwellings**.

0.2 This approved document contains the following sections:

Approved Document Section	Related Building Regulations requirements
Section 0: Introduction	N/A
Section 1: Calculating the Target Primary Energy Rate, Target Emission Rate and Target Fabric Energy Efficiency Rate	Regulations 24, 25, 25B, 26, 26A, 27, 27A and the new regulations for primary energy: Energy performance of buildings calculations
Section 2: Calculating the Dwelling Primary Energy Rate, Dwelling Emission Rate and Target Fabric Energy Efficiency Rate	
Section 3: Consideration of high efficiency alternative systems	[Regulation for the consideration of high efficiency alternative systems]
Section 4: Limiting heat gains and losses	Requirement L1(a) of Schedule 1
Section 5: Minimum building services efficiencies and controls – general guidance	Requirement L1(b)(i) and (ii) of Schedule 1 and [regulation for self-regulating devices]
Section 6: System specific guidance	
Section 7: Air permeability and pressure testing	Regulation 43
Section 8: Commissioning	Regulation 44, and Requirement L1(b)(iii) of Schedule 1
Section 9: Providing information	Regulation 40 and [the regulation for the energy performance of technical building systems]
Section 10: New elements in existing dwellings including extensions	23(2) and Requirement L1(a) of Schedule 1
Section 11: Work to elements in existing dwellings	Regulations 6, 22, 23(1) and Requirement L1(a) of Schedule 1
Section 12: Consequential Improvements	Regulation 28: Consequential Improvements to Energy Performance
Appendix A: Key terms	n/a
Appendix B: Reporting evidence of compliance	n/a

Appendix C: Work to thermal elements	n/a
Appendix D: Standards referred to	n/a
Appendix E: Documents referred to	n/a

Application

0.3 The guidance in this volume of Approved Document L applies to dwellings only.

*[**Note for consultation:** This consultation primarily regards work to existing dwellings, and relevant guidance has a blue background.*

In a mixed-use building, **Approved Document L, volume 2: Buildings other than dwellings** should be consulted for building work in those parts of the building that are not dwellings.

NOTE: Dwellings are self-contained units**.** Rooms for residential purposes are not dwellings, and so **Approved Document L, volume 2: Buildings other than dwellings** applies to them. Buildings that contain only rooms for residential purposes are not dwellings, and **Approved Document L, volume 2: Buildings other than dwellings** applies to them.

Common areas in buildings with multiple dwellings

0.4 The common areas of buildings containing more than one dwelling fall outside the scope of this document. For the common areas:

a. if they are heated follow **Approved Document L, volume 2: Buildings other than dwellings.**
b. if they are unheated, individual fabric elements should meet the minimum standards set out in **Section 4**.

New dwellings

0.5 Guidance for new dwellings is given in **Sections 1** to **9** of this approved document.

0.6 For a conservatory or porch installed as part of the construction of a new dwelling if both of the following apply:

a.there is adequate thermal separation between the dwelling and the conservatory or porch

b.the dwelling's heating system is not extended into the conservatory or porch.

should follow the guidance in this approved document in **Section 10**, treating the conservatory or porch as if it were an extension onto an existing dwelling,

Where a conservatory or porch is provided in a new dwelling and both a. and b. have not been achieved, the guidance for the whole new dwelling should be followed, including for Dwelling Primary Energy Rate, Dwelling Emission Rate and Dwelling Fabric Energy Efficiency Rate calculations, treating the conservatory or porch as a room in the new dwelling.

Extensions and work in existing dwellings

0.7 Guidance on complying with energy efficiency requirements is given for the following.

a. Limiting heat gains and losses: **Section 4**.
b. Building services: **Section 5** and **6**.
c. New elements in existing dwellings, including replacement of a thermal element and constructing an extension: **Section 10**.
d. Existing elements in existing dwellings, including renovating or retaining a thermal element, material change of use and change to energy status: **Section 11.**

NOTE: For building work in very large dwellings (>1000m^2), consequential improvements may be required to improve the energy efficiency of the building. Guidance is given in **Section 12**.

Exemptions for listed buildings, buildings in conservation areas and scheduled monuments

0.8 The following types of dwellings do not need to comply fully with the energy efficiency requirements, where to do so would unacceptably alter their character or appearance.

a. Those listed in accordance with section 1 of the Planning (Listed Buildings and Conservation Areas) Act 1990.
b. Those in a conservation area designated in accordance with section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990.
c. Those included in the schedule of monuments maintained under section 1 of the Ancient Monuments and Archaeological Areas Act 1979.

0.9 Work to a building in paragraph 0.8 must comply with the energy efficiency requirements where this would not unacceptably alter the building's character or appearance. The work should comply with standards in this approved document to the extent that it is reasonably practicable.

Reasonable provision for historic and traditional buildings

0.10 Historic and traditional buildings should only have their energy efficiency improved to the extent that it does not risk the long-term deterioration of the building fabric or fittings, in particular those that have a vapour permeable construction that both absorb and readily allows moisture to evaporate. These include wattle and daub, cob, stone and constructions using lime render or mortar.

0.11 New extensions to historic or traditional dwellings should comply fully with the standards of energy efficiency in this approved document unless there is a need to match the external appearance or character of the extension to that of the host building.

0.12 In determining whether full energy efficiency improvements should be made, the building control body should take into account the advice of the local authority's conservation officer.

0.13 Additional guidance is available in Historic England's *Energy Efficiency in Historic Buildings: Application of Part L of the Building Regulations to historic and traditionally constructed buildings (2017)*.

Exemptions for conservatories and porches

0.14 Where building work creates an extension to an existing dwelling and the extension is a conservatory or porch, the extension is exempt from the energy efficiency requirements, under Regulation 21 of the Building Regulations, if all of the following criteria are met.

a. The extension is at ground level.
b. The floor area does not exceed 30 m^2.
c. The glazing complies with Part K of Schedule 1.
d. any wall, door or window separating the conservatory or porch from the building has been retained, or if removed, replaced with a wall, door or window.
NOTE: the replacement walls, windows and doors should meet the requirement in regulation 23(2). See **Section 10.**
e. The heating system of the dwelling is not extended into the conservatory or porch.

Exemptions for covered areas

0.10 Where a building is extended through the addition of a carport open on at least two sides, a covered yard, covered walkway or covered driveway, the work is exempt from the energy efficiency requirements if both of the following are met.

a. The extension is at ground level.
b. The floor area of the extension does not exceed 30 m^2.

Live-work units

0.11 A unit that contains both living accommodation and space to be used for commercial purposes (e.g. as a workshop or office) should be treated as a dwelling, as long as the commercial part can revert to domestic use.

0.12 The commercial part of a building can revert to domestic use if all of the following apply.

a. There is direct access between the commercial space and the living accommodation.
b. The commercial space and the living accommodation are within the same thermal envelope.
c. The living accommodation comprises a substantial proportion of the total area of the unit. What constitutes a 'substantial proportion' should be assessed on a case-by-case basis.

NOTE: A large non-domestic building that contains a small flat for a manager is not treated as a dwelling. A dwelling that contains a room used as an office or utility space is still treated as a dwelling.

Mixed-use developments

0.13 When constructing a dwelling as part of a larger building that contains other types of accommodation, sometimes called a mixed-use development, refer to the two volumes of Approved Document L as follows.

a. For guidance on each individual dwelling, use this approved document (**Approved Document L, volume 1: dwellings**).
b. For guidance on the non-dwelling parts of the building, such as heated common areas and the commercial or retail space, *use* **Approved Document L, volume 2: Buildings other than dwellings.**

Selected key interactions with other parts of the Building Regulations

The approved documents set out, what in ordinary circumstances, may be accepted as one way to comply with the Building Regulations. It remains the responsibility of those designing or undertaking building work to assess, on a case-by-case basis, whether specific circumstances require additional or alternative measures to achieve compliance with the regulatory requirements. There are interactions between many of the requirements of the Building Regulations, here is guidance on some key interactions.

Interaction with Part C

0.14 This Approved Document provides guidance and examples on upgrading thermal elements. A lesser standard may be acceptable in order to ensure thermal elements comply with the requirements of Part C of interstitial and surface condensation. Guidance in **Approved Document C** should be followed.

Interaction with Part E

0.15 This Approved Document provides guidance on insulation that is reasonably continuous and limits thermal bridging. Construction junctions should have adequate edge sealing, following **Approved Document E.**

Interaction with Part F

0.16 This Approved Document provides guidance on reducing unwanted heat loss through airtightness. The air infiltration of a dwelling should be considered when specifying the minimum amount of purpose-provided ventilation, following **Approved Document F**.

Interaction with Part J

0.17 This Approved Document provides guidance on airtightness. Guidance on permanent ventilation openings for open flued appliances in very airtight buildings should be followed in **Approved Document J**.

Interaction with Part K and M

0.18 This Approved Document provides guidance on controls for fixed building services, building automation control systems and on-site electricity generation. Where manual controls are provided, they should be within reasonable reach of the occupants. Guidance provided in **Approved Documents K** and **M**.

Regulations 24, 25, 25B, 26, 26A 27, 27A and new regulations for primary energy: Energy performance of buildings calculations

This approved document deals with the requirements of regulations 24, 25, 25B, 26, 26A, 27 and 27A and new regulations for primary energy of the Building Regulations 2010.

[regulations will be amended as necessary in line with the intention sections below]

Methodology of calculation of the energy performance of buildings

24.(1) The Secretary of State shall approve–

(a) a methodology of calculation of the energy performance of buildings, including methods for calculating asset ratings and operational ratings of buildings; and

(b) ways in which the energy performance of buildings, as calculated in accordance with the methodology, shall be expressed.

(2) In this regulation–

'asset rating' means an energy performance indicator determined from the amount of energy estimated to meet the different needs associated with a standardised use of the building; and

'operational rating' means an energy performance indicator determined from the amount of energy consumed during the occupation of a building over a period of time and the energy demand associated with a typical use of the building over that period.

Minimum energy performance requirements for new buildings

[Regulation to be amended to add primary energy]

25. Minimum energy performance requirements shall be approved by the Secretary of State, calculated and expressed in accordance with the methodology approved pursuant to regulation 24, for–

(a) new buildings (which shall include new dwellings), in the form of target CO_2 emission rates; and

(b) new dwellings, in the form of target fabric efficiency rates.

Nearly zero-energy requirements for new buildings

25B. Where a building is erected, it must be a nearly zero-energy building.

Interpretation

35(1). ‘Energy performance of a building’ means the calculated or measured amount of energy needed to meet the energy demand associated with a typical use of the building, which includes, inter alia, energy used for heating, cooling, ventilation, hot water and lighting.

CO_2 emission rates for new buildings

26. Where a building is erected, it shall not exceed the target CO_2 emission rate for the building that has been approved pursuant to regulation 25, applying the methodology of calculation and expression of the energy performance of buildings approved pursuant to regulation 24.

Fabric energy efficiency rates for new dwellings

26A. Where a dwelling is erected, it shall not exceed the Target Fabric Energy Efficiency Rate for the dwelling that has been approved pursuant to regulation 25, applying the methodology of calculation and expression of the energy performance of buildings approved pursuant to regulation 24.

Primary energy rates for new buildings

[New regulation for primary energy for new buildings]

CO_2 emission rate calculations

27. (1) This regulation applies where a building is erected and regulation 26 applies.

(2) Not later than the day before the work starts, the person carrying out the work shall give the local authority a notice which specifies–

(a) the target CO_2 emission rate for the building, calculated and expressed in accordance with the methodology approved pursuant to regulation 24,

(b) the CO_2 emission rate for the building as designed, calculated and expressed in accordance with the methodology approved pursuant to regulation 24, and

(c) a list of specifications to which the building is to be constructed.

(3) Not later than five days after the work has been completed, the person carrying out the work shall give the local authority–

(a) a notice which specifies–

(i) the target CO_2 emission rate for the building, calculated and expressed in accordance with the methodology approved pursuant to regulation 24,

(ii) the CO_2 emission rate for the building as constructed, calculated and expressed in accordance with the methodology approved pursuant to regulation 24, and

(iii) whether the building has been constructed in accordance with the list of specifications referred to in paragraph (2)(c), and if not a list of any changes to those specifications; or

(b) a certificate of the sort referred to in paragraph (4) accompanied by the information referred to in sub-paragraph (a).

(4) A local authority are authorised to accept, as evidence that the requirements of regulation 26 have been satisfied, a certificate to that effect by an energy assessor who is accredited to produce energy performance certificates for that category of building.

(5) In this regulation, 'specifications' means specifications used for the calculation of the CO_2 emission rate.

Fabric energy efficiency rate calculations

27A. (1) This regulation applies where a dwelling is erected and regulation 26A applies.

(2) Not later than the day before the work starts, the person carrying out the work shall give the local authority a notice which specifies—

(a) the Target Fabric Energy Efficiency Rate for the dwelling calculated and expressed in accordance with the methodology approved pursuant to regulation 24;

(b) the fabric energy efficiency rate for the dwelling as designed, calculated and expressed in accordance with the methodology approved pursuant to regulation 24; and

(c) a list of specifications to which the dwelling is to be constructed.

(3) Not later than five days after the work has been completed, the person carrying out the work shall give the local authority—

(a) a notice which specifies—

(i) the Target Fabric Energy Efficiency Rate for the dwelling calculated and expressed in accordance with the methodology approved pursuant to regulation 24;

(ii) the fabric energy efficiency rate for the dwelling as constructed, calculated and expressed in accordance with the methodology approved pursuant to regulation 24; and

(iii) whether the dwelling has been constructed in accordance with the list of specifications referred to in paragraph (2)(c), and if not a list of any changes to those specifications; or

(b) a certificate of the sort referred to in paragraph (4) accompanied by the information referred to in sub-paragraph (a).

(4) A local authority is authorised to accept, as evidence that the requirements of regulation 26A have been satisfied, a certificate to that effect by an energy assessor who is accredited to produce energy performance certificates for that category of building.

(5) In this Regulation, 'specifications' means specifications used for the calculation of the fabric energy efficiency rate.

NOTE: Where the building control body is an approved inspector, see regulation 20 of the Building (Approved Inspectors etc.) Regulations 2010 (as amended).

NOTE: Buildings meet the definition of nearly zero-energy buildings by both:

a. meeting the Target Emission Rate required under Regulation 26
b. undertaking an analysis of the technical, environmental and economic feasibility of using high-efficiency alternative systems, which include decentralised energy supply systems based on energy from renewable sources and taking this analysis into account as required by Regulation 25A.

Intention

Regulation 24 and 25

Regulations 24 and 25 of the Building Regulations set requirements for the Secretary of State to set a methodology for the energy performance of a building. For a new dwelling, the approved methodology is the Standard Assessment Procedure.

Calculation methodologies are set out in **Section 1** and **Section 2**.

Regulation 26, 26A and [the regulation for target primary energy]

A newly constructed building must be shown to meet regulation 26, 26A and [the regulations for target primary energy] of the Building Regulations 2010, by producing calculations to show that the dwelling meets all of the following.

a. Target primary energy rate.
b. Target emission rate.
c. Target fabric energy efficiency rate.

A newly constructed building must be shown to meet regulation 27, 27A and [the regulations for dwelling primary energy] of the Building Regulations 2010 by producing calculations to show that the dwelling meets all of the following.

a. Dwelling primary energy rate.
b. Dwelling emission rate.
c. Dwelling fabric energy efficiency rate.

Sections 1 and 2 set out both of the following.

a. The requirements for meeting the Target Primary Energy Rate, Target Emission Rate and Target Fabric Energy Efficiency Rate.
b. The approved methodologies for calculating a Dwelling Primary Energy Rate, Dwelling Emission Rate and Dwelling Fabric Energy Efficiency Rate.

Section 1: Calculating the Target Primary Energy Rate, the Target Emission Rate and Target Fabric Energy Efficiency Rate

1.1 A new dwelling must be built to a minimum standard of total energy performance. This is evaluated by comparing calculations of the performance of the dwelling against calculations of the performance of a theoretical dwelling called the 'notional dwelling'. This must be carried out both at the design stage and when work is complete. The notional dwelling is of the same size and shape as the actual dwelling and has standardised properties for fabric and services. The full properties of the notional dwelling are set out in the Government's *Standard Assessment Procedure for energy rating of dwellings.*

1.2 The energy performance of the notional dwelling, which forms the target for the actual dwelling, is described the using following metrics.

a. The Target Primary Energy Rate, in kWh_{PE}/m^2/year: this is the primary energy used by the dwelling, influenced by the fabric and fuel choice.
b. The Target Emission Rate, in $kgCO_{2e}/m^2$/year: this is the minimum standard for CO_2 emissions from the dwelling, influenced by the fabric and the fuel choice.
c. The Target Fabric Energy Efficiency Rate, in kWh/m^2/year this is the fabric energy efficiency of the dwelling, influenced by the fabric only.

1.3 The Target Primary Energy Rate, Target Emission Rate and Target Fabric Energy Efficiency Rate for individual dwellings must be calculated using the Government's Standard Assessment Procedure for energy rating of dwellings, version 10. The standardised properties are in Appendix R and summarised in table 1.1 below.

NOTE: An up-to-date list of approved software can be found by following the link to SAP10 at the following web page: https://www.gov.uk/guidance/standard-assessment-procedure

[***Note for consultation:*** *SAP 10 and this list of approved software tools will not be available at consultation stage. A consultation version of the Standard Assessment Procedure, cSAP 10.1, is available at the following web page:* https://www.isap.org.uk/*.]*

1.4 The specification of the dwelling may vary from that of the notional dwelling, provided that the dwelling meets the Target Primary Energy Rate, Target Emission Rate, Target Fabric Energy Efficiency Rate and the guidance in this approved document.

Buildings that contain multiple dwellings

1.5 For a building that contains more than one dwelling, for example a block of flats or a terrace of houses, an average Target Primary Energy Rate, Target Emission Rate, and Target Fabric Energy Efficiency Rate may be calculated as an alternative to individual target rates for each dwelling. The floor-area-weighted average of the Target Primary Energy Rate, Target Emission Rates and Target Fabric Energy Efficiency Rate for all the dwellings in the building should be calculated using the following formula:

$$\frac{\{(\text{Target Primary Energy Rate}1 \times Floor\ area1) + (\text{Target Primary Energy Rate}2 \times Floor\ area2) + (\text{Target Primary Energy Rate}3 \times Floor\ area3) + \ldots\}}{(Floor\ area1 + Floor\ area2 + Floor\ area3 + \ldots)}$$

1.6 The average Target Emission Rate should be calculated using the formula above but replacing Target Primary Energy Rate with Target Emission Rate. The average Target Fabric Energy Efficiency Rate should be calculated using the formula above but replacing Target Primary Energy Rate with Target Fabric Energy Efficiency Rate. Calculating an average Target Primary Energy Rate, Target Emission Rate, or Target Fabric Energy Efficiency Rate for separate buildings on the same site is *not* considered to be a reasonable demonstration of compliance.

Notional Dwelling Specification

1.7 The full notional dwelling specification used in the Standard Assessment Procedure (SAP) can be found in Appendix R of SAP 10.2 https://www.bregroup.com/sap/sap10/. Table 1.1 is a summary of the notional dwelling specification.

[***Note for consultation:*** *SAP 10.2 is not available at consultation stage. A consultation version of the Standard Assessment Procedure, cSAP 10.1, is available at the following web page:* https://www.isap.org.uk/*.]*

Table 1.1: Summary of notional dwelling specification for new dwellings	
Element or System	**Reference Value for Target Setting**
Opening areas (windows, roof windows, rooflights and doors)	Same as actual dwelling up to a maximum for total area of openings of 25% of total floor area.[1]
External walls including semi-exposed walls	U = 0.18 W/m²K
Party walls	U = 0
Floors	U = 0.13 W/m²K
Roofs	U = 0.11 W/m²K
Opaque door (<30% glazed area)	U = 1.0 W/m²K
Semi-glazed door (30-60% glazed area)	U = 1.0 W/m²K
Windows and glazed doors with >60% glazed area	U = 1.2 W/m²K Frame factor = 0.7
Roof windows	U = 1.2 W/m²K . For more details see specification in Appendix R.
Rooflights	U = 1.2 (no correction applied)
Ventilation system	Natural ventilation with intermittent extract fans
Air permeability	5 m³/h·m² at 50 Pa
Main heating fuel (space and water)	Mains gas
Heating system	Boiler and radiators Central heating pump 2013 or later, in heated space Design flow temperature = 55°C
Boiler	Efficiency, SEDBUK(2009) = 89.5%
Heating system controls	Boiler interlock, ErP Class V Either: single storey dwelling in which the living area > 70% of total floor area - programmer and room thermostat; or: any other dwelling - time and temperature zone control + TRVs;
Hot water system	Heated by boiler (regular or combi as above) Separate time control for space and water heating
Wastewater heat recovery	All showers connected to WWHR including showers over baths Instantaneous WWHR with 36% recovery efficiency Utilisation of 0.98, wastewater fraction 0.9.
Hot water cylinder	If cylinder, declared loss factor = 0.85 x (0.2 + 0.051 V2/3) kWh/day, where V is the volume of the cylinder in litres
Lighting	Fixed lighting capacity (lm) = 185 x TFA Efficacy of all fixed lighting = 80 lm/W
Air conditioning	None
PV system	For houses kWp = 40% of ground floor area / 6.5 For flats kWp = 40% of dwelling floor area / (6.5 * number of storeys in block) System facing SE/SW.
Notes: 1. See SAP manual for details.	

Section 2: Calculating the Dwelling Primary Energy Rate, Dwelling Emission Rate and the Dwelling Fabric Energy Efficiency Rate

2.1 The same approved calculation tool, detailed in paragraph 1.3, must be used to calculate the Target Primary Energy Rate, Target Emission Rate and Target Fabric Energy Efficiency Rate and Dwelling Primary Energy Rate, Dwelling Emission Rate and Dwelling Fabric Energy Efficiency Rate.

2.2 The Dwelling Primary Energy Rate, Dwelling Emission Rate, and Dwelling Fabric Energy Efficiency Rate must be calculated at both of the following points using the same calculation tool.

a. Before work starts, using design values.

b. When work is complete, using figures for the building as constructed, incorporating both of the following.

i. Any changes to the list of specifications that have been made during construction.
ii. The measured air permeability.

The Dwelling Primary Energy Rate, Dwelling Emission Rate, and Dwelling Fabric Energy Efficiency Rate must be no greater than the Target Primary Energy Rate, Target Emission Rate and the Target Fabric Energy Efficiency Rate respectively.

Building control notification

2.3 The building control body must be notified before the work starts of all the following.

a. The Target Primary Energy Rate and the Dwelling Primary Energy Rate (calculated using design values).
b. The Target Emission Rate and the Dwelling Emission Rate (calculated using design values).
c. The Target Fabric Energy Efficiency Rate and the Dwelling Fabric Energy Efficiency Rate (calculated using design values).
d. A list of specifications used in the calculations.

a. to d. can be reported using the design stage Building Regulations England Part L Compliance report (BREL report). For further details of the design stage BREL report, see **Appendix B**.

2.4 The building control body must be notified once the work is complete of all of the following:

a. The as-built Target Primary Energy Rate and as-built Dwelling Primary Energy Rate.
b. The as-built Target Emission Rate and as-built Dwelling Emission Rate.
c. The as-built Target Fabric Energy Efficiency Rate and as-built Dwelling Fabric Energy Efficiency Rate.
d. A list of specifications used in the as-built calculations and whether the specifications have changed from those provided at design stage.

Building control bodies are authorised to accept notification of a. to d. as reported in the completion stage **BREL** report and photographic evidence of compliance. For further details of the after completion BREL report and photographic evidence, see **Appendix B**.

Buildings that contain multiple dwellings

2.5 Buildings that contain more than one dwelling must comply with either of the following.

a. Every individual dwelling has all of:
    i. a Dwelling Primary Energy Rate that is no greater than the individual dwelling's Target Primary Energy Rate
    ii. a Dwelling Emission Rate that is no greater than the individual dwelling's Target Emission Rate
    iii. a Dwelling Fabric Energy Efficiency Rate that is no greater than the individual dwelling's Target Fabric Energy Efficiency Rate.

OR

b. All of:
    i. the average Dwelling Primary Energy Rate for the whole building, calculated in accordance with paragraph 2.6, is no greater than the average Target Primary Energy Rate.
    ii. the average Dwelling Emission Rate for the whole building, calculated in accordance with paragraph 2.6 is no greater than the average Target Emission Rate.
    iii. the average Dwelling Fabric Energy Efficiency Rate for the whole building, calculated in accordance with paragraph 2.6, is no greater than the average Target Fabric Energy Efficiency Rate.

2.6 The average Dwelling Primary Energy Rate, Dwelling Emission Rate and Dwelling Fabric Energy Efficiency Rate are the floor-area-weighted average of the individual Dwelling Primary Energy Rate, Dwelling Emission Rate and Dwelling Fabric Energy Efficiency Rate for all the dwellings in the building. Guidance on how to calculate an average Target Primary Energy Rate is in paragraph 1.5, and guidance on calculating an average Target Emission Rate and average Target Fabric Energy Efficiency Rate is given in paragraph 1.6. The average Dwelling Primary Energy Rate, Dwelling Emission Rate and Dwelling Fabric Energy Efficiency Rate should be calculated using the same averaging methodology.

An average Dwelling Primary Energy Rate, Dwelling Emission Rate or Dwelling Fabric Energy Efficiency Rate should *not* be calculated across separate buildings on a site.

NOTE: Information and photographic evidence must be provided for each individual dwelling, as described in **Section 9** and **Appendix B**.

Special considerations when calculating the Dwelling Primary Energy Rate and Dwelling Emission Rate

Secondary heating in the Dwelling Primary Energy Rate and Dwelling Emission Rate calculation

2.7 When calculating the Dwelling Primary Energy Rate and Dwelling Emission Rate for a dwelling with a secondary heating appliance, all of the following apply.

a. The fraction of heat provided by the secondary heating system in the calculation must be as defined by the Standard Assessment Procedure for the particular combination of main heating system and secondary heating appliance.

b. The efficiency of the secondary heating appliance with its appropriate fuel should be used in the calculation of the Dwelling Primary Energy Rate and Dwelling Emission Rate.

c. If a chimney or flue is provided but no appliance is installed, the presence of the following appliances should be assumed when calculating the Dwelling Primary Energy Rate and Dwelling Emission Rate.

i. If a gas point is located adjacent to the hearth, assume a decorative fuel-effect gas fire open to the chimney or flue with an efficiency of 20 per cent.

ii. If there is no gas point, either:

- if the dwelling is *not* in a smoke control area, assume an open fire in grate for burning multi-fuel with an efficiency of 37 per cent
- if the dwelling is in a smoke control area, the fuel should be taken as smokeless solid mineral fuel.

d. If no secondary heating appliance is installed and there is no chimney or flue provided, then no secondary heating system should be assumed in the calculation.

Community heating systems and district heat networks

2.8 When determining the Dwelling Primary Energy Rate and Dwelling Emission Rate for a dwelling connected to a community heating system, the annual percentage of heat supplied from each heat source should be the same for each newly connected dwelling. A submission to the building control body should be made to demonstrate that the community heating system has the capacity to provide the percentage of heat that is assumed.

When calculating the percentage of heat supplied from a district heat network or community heating system, the calculation should account for the predicted effect of all dwellings which will be connected to the system in the first 12 months after the dwellings are connected, so that the increased operation of any marginal plant (e.g. gas boilers) is properly accounted for.

Swimming pool basins

2.9 When determining the Dwelling Primary Energy Rate, Dwelling Emission Rate and Dwelling Fabric Energy Efficiency Rate for a dwelling with a swimming pool, the thermal performance of the pool basin should not be included in the calculation. Instead, the Dwelling Primary Energy Rate, Dwelling Emission Rate and Dwelling Fabric Energy Efficiency Rate should be calculated as if the area covered by the pool were replaced with the equivalent area of floor with the same U-value as the pool surround.

Party walls

2.10 When calculating the Dwelling Primary Energy Rate, Dwelling Emission Rate and Dwelling Fabric Energy Efficiency Rate for a dwelling, a party wall U-value for the type of construction adopted as set out in Table 2.1 should be applied.

Table 2.1 U-values for party walls

Party wall construction	U-value W/(m^2.K)
Solid	0.0
Unfilled cavity with no effective edge sealing	0.5
Unfilled cavity with effective sealing around all exposed edges and in line with insulation layers in abutting elements[1]	0.2
A fully filled cavity with effective sealing at all exposed edges and in line with insulation layers in abutting elements[1]	0.0

NOTES

1. To claim a reduced U-value due to edge sealing, it is necessary to demonstrate that the edge sealing is likely to be robust under normal site conditions.

Internal lighting in the dwelling emission and Dwelling Primary Energy Rate calculations

2.11 Both the Dwelling Primary Energy Rate and Dwelling Emission Rate calculations should account for the efficacy of lamps installed in the fixed lighting locations.

Achieving the Target Primary Energy Rate, Target Emission Rate and Target Fabric Energy Efficiency Rate

2.12 Provided the dwelling satisfies the minimum standards for fabric set out in **Section 4**, the designer can achieve the Target Primary Energy Rate and the Target Emission Rate by using any combination of the following.

a. Fabric energy efficiency.
b. Efficient building services.
c. Low and zero carbon technologies integrated in an appropriate mix.

2.13 The designer can achieve the Target Fabric Energy Efficiency Rate only through fabric energy efficiency.

NOTE: To meet the Target Fabric Energy Efficiency Rate the energy efficiency of some elements will need to be significantly better than the minimum standards for fabric set out in **Section 4.**

Regulation for the consideration of high efficiency alternative systems

This approved document deals with the requirements of [the regulation for the consideration of high efficiency alternative systems as amended] of the Building Regulations 2010.

Regulation for the consideration of high efficiency alternative systems.

[Amended regulation for the consideration of high efficiency alternative systems]

NOTE: Where the building control body is an approved inspector, see regulation 20 of the Building (Approved Inspectors etc.) Regulations 2010 (as amended).

Intention

When a new dwelling is erected, the person carrying out the work must comply with [the regulation for the consideration of high efficiency alternative systems] of the Building Regulations 2010 by analysing the feasibility of installing high efficiency alternative systems.

The Building Regulations do not require that high-efficiency alternative systems or other low and zero carbon systems are installed.

Section 3 of this document provides more details.

Section 3: Consideration of high efficiency alternative systems

3.1 Before building work starts on a new dwelling, the person undertaking the work must analyse the technical, environmental and economic feasibility of using high efficiency alternative systems in the dwelling design. This analysis should be taken into account when designing the dwelling.

3.2 The analysis of high efficiency alternative systems must be documented and available for verification processes. The documentation should state whether high efficiency alternative systems have been included in the dwelling design.

3.3 The analysis may be carried out for individual dwellings, groups of similar dwellings, or for common types of dwellings in the same area. Where a number of dwellings are connected to a district heat network or community heating system, a single analysis may be carried out for all the dwellings connected to the network or system. The documented results of the analysis should be retained for the building control body to inspect upon request.

3.4 The analysis may also consider the issues of healthy indoor climate conditions, fire safety, and risks related to intense seismic activity.

3.5 When a building undergoes a major renovation, this may represent an opportunity to consider all of the following.

- **a.** The technical, environmental and economic feasibility of installing high efficiency alternative systems.
- **b.** Healthy indoor conditions, fire safety and risks related to intense seismic activity.

Requirement L1(a): Limiting heat gains and losses

This approved document deals with the requirements of Part L1(a) of Schedule 1 to the Building Regulations 2010.

Requirement	*Limits on application*
Schedule 1 – Part L Conservation of fuel and power **L1. Reasonable provision shall be made for the conservation of fuel and power in buildings by:** **(a) limiting heat gains and losses–** **(i) through thermal elements and other parts of the building fabric; and** **(ii) from pipes, ducts and vessels used for space heating, space cooling and hot water services;** (b) providing fixed building services which– (i) are energy efficient; (ii) have effective controls; and (iii) are commissioned by testing and adjusting as necessary to ensure they use no more fuel and power than is reasonable in the circumstances.	

Intention

In the Secretary of State's view, requirement L1(a) is met in a new dwelling by achieving both of the following.

a. Limiting unwanted heat *losses* from the dwelling by meeting the standards for all of the following.
   i. The building fabric, including walls, floors, roof, windows and openings - paragraphs 4.1 to 4.6 and paragraphs 4.11 to 4.18.
   ii. Uncontrolled air loss - **Section 7**.
   iii. The pipework and services – paragraphs 4.15 to 4.23.

b. Limiting unwanted heat *gains* to the dwelling, throughout the year, through any of the routes listed in point a. as set out in **Section 4**.

In the Secretary of State's view, requirement L1(a) is met for work carried out to an existing dwelling by achieving the following where relevant to the work being done.

a. Limiting unwanted heat *losses* from the dwelling by meeting the standards for all of the following.
    i. Any building fabric to which building work is being carried out, including walls, floors, roof, windows and openings – paragraphs 4.1 to 4.5 and paragraphs 4.7 to 4.10. Further guidance is given in the following sections.
        - For new elements, replacement elements and extensions – **Section 10.**
        - For renovated elements, retained elements, a change to energy status and a material change of use – **Section 11.**
    ii. Any work which might result in uncontrolled air loss – paragraph 4.14.

b. Limiting unwanted heat *gains* from any pipework and services to which building work is carried out by following paragraphs 4.15 to 4.23.

NOTE: If work includes an extension to an existing dwelling, initial provision of fixed building services or increase to installed capacity of fixed building services, consequential improvements may be required - **Section 12**.

Section 4: Limiting heat gains and losses

***[Note for consultation:** This consultation regards work to existing dwellings, with relevant guidance highlighted in blue. Guidance for new dwellings is provided only for reference].*

U-values

4.1 U-values should be calculated using the methods and conventions set out in the Building Research Establishment's *BR 443*. U-values should be for the whole thermal element (e.g. in the case of a window, the combined performance of the glazing and the frame).

4.2 The U-value of a window should be calculated for one of the following.

a. The specific size and configuration of the window.
b. The smaller of the two standard windows defined in **BS EN 14351-1.**
c. The standard configuration set out in Building Research Establishment's *BR 443*.

4.3 The U-value of a door should be calculated for either of the following.

a. The specific size and configuration of the door.
b. The standard size as laid out in **BS EN 14351-1**.

4.4 Alternatively, the default value from the Standard Assessment Procedure Table 6e can be used for doors or windows.

4.5 To correctly assess whether an element meets the limiting U-value, it must be in the appropriate plane – either horizontal or vertical. Windows and roof windows should have their U-values calculated based on a vertical position. Rooflights should have their U-values calculated based on a horizontal position. If the data available for the element is in the incorrect plane, it should be adjusted according to the guidance in Building Research Establishment's *BR 443*.

NOTE: This is not applicable for Standard Assessment Procedure calculations, where the U-value of each element is calculated based on the plane of its construction or installation.

Limiting standards in new dwellings

4.6 New insulating fabric elements in new dwellings should meet the limiting standards in Table 4.1.

Table 4.1 Limiting U-values for new fabric elements and air permeability in new dwellings

Element type	Maximum U-value[1] W/(m^2.K)
All roof types[2]	0.16
Wall[2]	0.26
Floor	0.18
Party wall	0.20
Swimming pool basin	0.25
Window[3,4]	1.6
Rooflight[5,6]	2.2
Doors (including glazed doors)	1.6
Air Permeability	8.0 m^3/ h.m^2 @ 50Pa 1.57 m^3/ h.m^2 @ 4Pa

NOTES:

1. Area-weighted average values.
2. For dormer windows, 'roof' includes the roof parts of the windows, and 'wall' includes the wall parts (cheeks).
3. If performance requires thicker glass to be used, an equivalent window unit with standard thickness (6mm) glazing should be shown to meet the required standard.
4. Including roof windows and curtain walling.
5. U-values for rooflights or rooflight-and-kerb assemblies should be based on the developed surface area of the rooflight (U_d values), which is often greater than the area of the roof opening. Further guidance on U_d values is given in **BR 443** and National Association of Rooflight Manufacturer's *Technical Document NTD 2.*
6. The limiting value for rooflights also applies to kerbs which are supplied as part of a single rooflight-and-kerb assembly sourced from the same supplier and for which the supplier can provide a combined U_d-value for the assembly. An upstand built on site should have a maximum U-value of 0.35W/m^{2}K.

NOTE: To meet the Target Fabric Energy Efficiency Rate, set out in **Section 1,** the energy efficiency of some elements will need to be significantly better than the limiting standards in Table 4.1**.**

Limiting standards in existing dwellings

New and replacement elements

4.7 New insulating elements in existing dwellings should meet the limiting standards in Table 4.2. Guidance on when a new element must meet the requirements in this table is given in **Section 10**. This includes both of the following.

a. Elements in extensions to existing dwellings.
b. New or replacement elements in existing dwellings.

4.8 If windows or fully glazed external pedestrian doors cannot meet the requirements of Table 4.2 because of the need to maintain the character of the building, either of the following should apply.

a. These fittings should have a maximum centre pane U-value of 1.2 W/(m^2.K).

b. Single glazing should be supplemented with low-emissivity secondary glazing.

Table 4.2 Limiting U-values for new fabric elements in existing dwellings

Element type	Maximum U-value[1] (W/m².K)
Roof[2]	0.15
Wall[2,3]	0.18
Floor[4,5]	0.18
Swimming pool basin	0.25
Window[6,7]	1.4 or Window Energy Rating[8] Band B minimum
Rooflight[9,10]	2.2
Doors with >60% of internal face glazed	1.4 or Doorset Energy Rating[8] Band C minimum
Other doors	1.4 or Doorset Energy Rating[8] Band B minimum

NOTES:

1. Area-weighted average values.
2. For dormer windows, 'roof' includes the roof parts of the windows, and 'wall' includes the wall parts (cheeks).
3. If meeting such a standard would reduce more than 5% of the internal floor area of the room bounded by the wall, a lesser provision may be appropriate.
4. If meeting such a standard would create significant problems in relation to adjoining floor levels, a lesser provision may be appropriate.
5. The U-value of the floor of an extension can be calculated using the exposed perimeter and floor area of the whole enlarged dwelling.
6. If performance requires thicker glass to be used, an equivalent window unit with standard thickness (6mm) glazing should be shown to meet the required standard.
7. Including roof windows and curtain walling.
8. The methods for calculating Window Energy Rating and Doorset Energy Rating are set out in the Glass and Glazing Federation's *Guide to the Calculation of Energy Ratings for Windows, Roof windows and Doors.*
9. U-values for rooflights or rooflight-and-kerb assemblies should be based on the outer developed surface area, which is often greater than the area of the roof opening. Further guidance on U_d-values is given in **BR 443** and the National Association of Rooflight Manufacturer's Technical Document *NTD 2.*
10. The limiting value for rooflights also applies to kerbs which are supplied as part of a single rooflight-and-kerb assembly sourced from the same supplier and for which the supplier can provide a combined U_d-value for the assembly. An upstand built on site should achieve a U-value of 0.35W/m²K.

Renovated elements

4.9 Existing elements undergoing renovation should meet the limiting standards in Table 4.3. Guidance on when an existing element must meet the requirements in this table is given in **Section 11**. This includes both of the following.

a. Thermal elements being renovated in existing dwellings. Renovated elements should achieve the U-values in Table 4.3, column (b).

b. Elements being retained in existing dwellings e.g. through a loft or garage conversion. Retained elements whose U-value is worse than the threshold value in Table 4.3, column (a), should be upgraded to achieve the U-values in Table 4.3, column (b).

4.10 If achieving the U-value in Table 4.3, column (b) is either:

a. not technically or functionally feasible
b. would not achieve a simple payback of 15 years or less.

then the element should be upgraded to the best standard that both:

a. is technically and functionally feasible
b. can be achieved with a simple payback of no greater than 15 years.

Generally, a thermal element once upgraded should not be worse than 0.7 W/(m^2.K). A lesser standard than this may be acceptable, for example, where it complies with Part C of the Building Regulations - in particular, the protection from the harmful effects of interstitial and surface condensation.

NOTE: Examples are provided in **Appendix C**.
NOTE: When renovating thermal elements, the work should comply with all the requirements in Schedule 1, but particular attention should be paid to Parts B, F and J.

Table 4.3. Limiting U-values for existing elements in existing dwellings

Element	(a) Threshold U-value[1] W/(m^2·K)	(b) Improved U-value[1] W/(m^2·K)
Roof[2,3,4]	0.35	0.16
Wall – cavity insulation[2,5]	0.70	0.55
Wall – internal or external insulation[2,6]	0.70	0.30
Floor[7,8]	0.70	0.25

NOTES:

1. Area-weighted average values.
2. For dormer windows, 'roof' includes the roof parts of the windows and 'wall' includes the wall parts (cheeks).
3. If meeting such a standard would create limitations on head room, a lesser provision may be appropriate. In such cases, both:
   a. the depth of the insulation plus any required air gap should be at least to the depth of the rafters
   b. the insulant should be chosen to achieve the best practicable U-value.
4. If there are problems with the load-bearing capacity of the frame or height of the upstand, a lesser provision may be appropriate.
5. This applies only to a wall that is suitable for cavity insulation. Where this is not the case, it should be treated as 'wall – external or internal insulation'.
6. If meeting such a standard would reduce by more than 5% the internal floor area of the room bounded by the wall, a lesser provision may be appropriate.
7. The U-value of the floor of an extension may be calculated using the exposed perimeter and floor area of the whole enlarged building.
8. If meeting such a standard would create significant problems in relation to adjoining floor levels, a lesser provision may be appropriate.

Continuity of insulation

4.11 Gaps in insulation can have a significant impact on heat loss and thermal bypass and risk the formation of condensation and mould. The building fabric should be constructed so that the insulation is reasonably continuous across newly built elements.

4.12 To ensure continuity of insulation in new dwellings all of the following apply.

a. **Drawings** should identify the insulation layer. These should be reviewed by the designer and installer to ensure continuity of insulation, buildability and robustness.
b. **An on-site audit** should be undertaken to confirm the designed details have been constructed prior to elements being concealed over. Photographs of the details should be taken in line with **Appendix B.**.
c. **Floors and foundations:** insulation should be installed tight to the structure without air gaps between insulation panels and at edges.
    i. Perimeter insulation should be continuous and have a minimum thickness of 25mm.
    ii. Moisture-resistant insulation should be fitted below damp-proof course level and extend to foundation block/structure.
d. **Windows and doors:** should be installed in a manner to maintain the thermal integrity of the insulated plane.
    i. Tolerance around window or door unit and surrounding opening should be minimal and be in accordance with **BS 8213-4**.
    ii. Position: locate window or door units with an overlap of between 30mm and 50mm (windows) and 50mm (doors) between the inner face of the unit and the inner face of the external leaf such that the window unit is contiguous with the insulation layer of the external wall.
    iii. Fully insulated and continuous cavity closers should be used, installed tight to insulation and cavity aperture. For door units, install perimeter insulation within the threshold zone or use a reinforced cavity closure.
e. **Walls:** insulation should be fitted without any air gaps and tight to the structure, cavity closers, lintels, and cavity trays. Mortar snots should be removed to ensure tight fitting with the structure, and cavities cleared of all debris. Where fire-stopping socks are required these should fully fill the areas where they are fitted, including at the heads of cavities.
f. **Roofs:** insulation should be installed tight to structure, without air gaps, and should extend to the wall insulation. For roofs insulated at ceiling level, consideration should be given to the long-term protection of the insulation layer: boarded areas should be provided above the insulation to afford access for maintenance.
g. **Rigid insulation boards:** should only be used on flat surfaces and fitted to the structure in such a manner to avoid any gaps between board edges and between the board facings. Consideration should be given to using boards having lapped or tongue and groove edges. Any unavoidable gaps between boards should be infilled using compressible tape (e.g. boards within roof rafters), or low expansion foam (e.g. boards in wall cavity).
h. **Penetrating elements**: include steel beams, incoming services, meter boxes and subfloor vents. Designs should clearly indicate means to limit insulation disruption. For recessed meter boxes on the cold side of the construction, insulation should be installed behind the enclosure. For incoming services, insulation should fit tightly around ducts, pipes, etc.

Thermal bridging

4.13 Thermal bridges occur when an area of a building has significantly higher heat transfer than the surrounding parts. Breaks in insulation, reduced insulation, or more conductive materials can contribute to thermal bridge effects. The building fabric should be constructed so that thermal bridging, including at the party wall, is reasonably limited.

4.14 To limit thermal bridging in new dwellings all of the following apply.

a. **Drawings** should be provided for junctions. These should be reviewed by the designer and installer for their buildability and to ensure construction sequencing is carefully considered for each detail. Complex details should be avoided wherever possible.
b. **An on-site audit** should be undertaken to confirm the designed details have been constructed prior to elements being concealed over. Photographs of the details should be taken in line with **Appendix B: Reporting evidence of Compliance**.
c. **Product specification:** opportunities should be considered to use products that help to reduce thermal bridges, this includes both of the following.
    i. Masonry construction: lightweight blockwork in the inner leaf of a cavity wall or both leaves of a party wall can help reduce thermal transmittance, particularly at junctions such as the ground floor to wall junction.
    ii. Timber construction: the use of insulated plasterboard on the inside of the frame can help reduce bridging at various junctions.
d. **Product substitution:** products upon which the design is based should be used. If a product is substituted, the revised specification should be reflected in the SAP calculation and reported on the BREL report.
e. **Foundations:** blocks below the damp proof course should match those specified in the design for the above ground main wall element (in masonry construction) wherever possible.
f. **Ground floors and external walls:** the wall to floor junctions should be detailed to achieve continuity of insulation.
    i. Perimeter floor insulation should abut or extend the full depth of the main floor insulation according to the design.
    ii. Masonry construction: external or cavity wall insulation should be extended below the damp-proof course (where applicable) and at least the equivalent of one full block height (215mm) below the underside of floor structure/slab and beyond the depth of the floor insulation.
    iii. Timber construction: insulation within board/sheathing should extend fully to the floor plate. Consideration should be made in the design such that the insulation is contiguous between the wall insulation and the floor perimeter insulation.
g. **Intermediate floors:** floor to wall junctions should be detailed to ensure insulation in the external wall is continuous. In the case of timber frame where the intermediate floor structure breaches the external wall insulation, further insulation should be included within the depth of the intermediate floor structure with that having an equivalent thickness of the insulation used in the external wall.
h. **Windows:** specify designs which minimise thermal bridging.
    i. Lintels: consider using independent lintels with insulated cavity closure between inner and outer lintel. For common leaf lintels, the base plate should not be continuous, and the lintel core should be insulated.
    ii. Insulated cavity closers should be used for all construction types. Insulated plasterboard should additionally be used in reveals to abut jambs and should be considered within reveal soffits.
i. **Roofs:** continuity of insulation should be achieved at the wall to eaves and wall to gable junctions.
    i. Wall insulation should be installed to the top of the wall plate, which in some cases, e.g. eaves may be above the cavity closure or barrier. In all cases, roof insulation should be continuous with the wall insulation.
    ii. Roofs insulated at ceiling level: insulation at the eaves should extend beyond the wall insulation without any reduction in thickness to the loft insulation incurred by the pitch of the roof. The roof insulation should be installed when the eaves are still

accessible. At gables and party walls, insulation should extend to the wall, which may require perimeter insulation where the space between the wall and joist is less than 100mm.

iii. Roofs insulated at rafter level: insulation at the eaves should extend to top of external wall. Voids between insulation at top of external wall and cavity wall/timber frame insulation should be fully filled with insulation.

NOTE: Any solution to edge sealing or thermal bridging in new dwellings should take particular account of **Part E** of the Building Regulations.

4.15 Thermal bridges should be assessed in a new dwelling using one of the following.

a. Use construction joint details calculated by a suitably competent person following the guidance in The Building Research Establishment's *BR 497,* and the temperature factors set out in the Building Research Establishment's *Information Paper 1/06.*

b. Use junction details from a reputable non-government database containing independently assessed thermal junction details, such as Local Authority Building Control's *Construction Details* library.

c. Use the values in the Standard Assessment Procedure, Table K1. A mixture of known and default values can be used.

d. Use a default *y*-value of 0.20 W/(m^2·K).

NOTE: A mixture of approaches may be used for different elements on the same building. When using the approach in (a) or (b), an appropriate system of site inspection should be in place.

Airtightness

Airtightness in new dwellings

4.16 The minimum standard for air permeability of a new dwelling is in Table 4.1. When carrying out work in new dwellings, care should be taken to reduce unwanted heat loss through air infiltration.

4.17 To ensure airtightness in new dwellings, all of the following apply.

a. **Drawings:** all relevant drawings should be provided that clearly identify the position, continuity, and the extent of the air barrier. These should be reviewed by the designer and installer and should include specifications for key materials.

b. **Incoming services:** group ducts, and cables wherever possible to minimise the number of penetrations through the air barrier, whilst ensuring sufficient space to allow adequate screed flow between ducts (use temporary supports for services during floor works). Grommets or flexible collars should be used around incoming services and sealed to the air barrier with air sealing tape or sealant.

c. **Internal building services:** service penetrations should be as small as possible and should be core drilled to limit damage. The penetrations should be sealed to the air barrier using proprietary grommets, collars, using air sealing tape or sealant. Where membranes are employed use careful detailing to achieve a robust and durable seal at these penetrations.

d. **Structural penetrations:** need to be effectively sealed for airtightness. Timber joist hangers should be considered in lieu of penetrations through the inner leaf.

e. **Cavity walls:** the inner block leaf mortar joint should be fully filled and pointed within the cavity. In circumstances where dense aggregate blocks have been used, plaster,

parge coat, or liquid membranes should be applied internally to reduce air permeability through. Internal plasterboard linings are not appropriate for use as an air barrier solution.

f. **Timber frame:** the vapour control layer should be lapped at seams and junctions and taped where it is the airtightness barrier. Any damage such as tears should be repaired prior to boarding. Where sheathing board forms the air barrier, air sealing tape should be applied at junctions and edges.
g. **Fixings:** care should be taken to avoid damage to the airtightness barrier from fixings.
h. **Windows and doors:** window and door units should connect to the primary air barrier to ensure continuity. Window and door frames should be taped to surrounding structural openings to ensure continuity of the air barrier using air sealing tape. Compressible seals or gun sealant may be used to supplement taping.
i. **Loft hatches:** where roof is insulated at ceiling level, hatches should be suitably designed and installed to ensure optimum airtightness.

4.18 To avoid air movement within thermal elements, either:

a. The insulation layer should be against the air barrier at all points in the building envelope.
b. the space between the air barrier and insulation layer should be filled with solid material.

Airtightness in existing dwellings

4.19 When carrying out work in existing dwellings, care should be taken to reduce unwanted heat loss through air infiltration. This includes by doing all of the following:

a. When installing pipework or services, sealing around services penetrations.
b. When installing or renovating thermal elements, draft-proofing the element being installed and filling air-leakage gaps in renovated thermal elements.
c. When installing windows, roof windows, rooflights or doors (controlled fittings), ensuring that the controlled fitting is well fitted and reasonably draft-proof.

NOTE: Particular attention should be paid to Approved Document F (ventilation) and Approved Document J (combustion appliances and fuel storage systems) when making an existing building more airtight.

Limiting heat losses from building services

Hot water pipework

4.20 In a new system, all of the following new pipework should be insulated.

a. Primary circulation pipes for heating circuits where they pass outside the heated living space, including where pipework passes into voids.
b. All primary circulation pipes for domestic hot water.
c. All pipes that are connected to hot water storage vessels, for at least 1 metre from the point at which they connect to the cylinder.
d. All secondary circulation pipework that is kept hot by that circulation.

4.21 In an existing system whenever a boiler or hot water storage vessel is replaced, any accessible pipes in the dwelling, should be insulated.

4.22 Heat losses from insulated pipework should not exceed those in **BS 5422** for hot water services at 60°C, regardless of the actual design temperature. Meeting the standards in Table 4.4 is one way of demonstrating that this has been achieved.

Table 4.4 Minimum thicknesses of pipework insulation for hot water services and space heating applications using high performance insulation	
Nominal internal pipe diameter (mm)	**Minimum insulation thickness[1] (mm) for low temperature hot water systems**
Less than or equal to 10	5
Less than or equal to 25	10
Less than or equal to 50	15
Less than or equal to 100	20
NOTES: [1]Thicknesses apply for insulation with a thermal conductivity of 0.025W/m.K or better. For other circumstances consult **BS 5422**.	

External pipework for district heat networks

4.23 Pipework for district heat networks should be insulated to either of the following.

a. The standards in **BS EN 253** for pre-insulated pipes.
b. An equivalent performance for conventionally insulated pipes.

4.24 Where pipework is run above ground, the performance of the pipe insulation should be at least as high as the insulating performance of pipework in the buried part of the system.

Heated water storage for space or domestic hot water

4.25 Vessels that store heated water for a heating or domestic hot water system should have standing losses that are a maximum of the heat loss given in Table 4.5 for that system type.

Table 4.5 Maximum daily heat loss for a hot water cylinder[1]			
Nominal volume (litres)	**Heat loss (kWh/24h)**	**Nominal volume (litres)**	**Heat loss (kWh/24h)**
50	1.03	400	2.59
100	1.49	500	2.80
150	1.88	600	2.98
200	2.06	700	3.14
250	2.22	800	3.29
300	2.36	900	3.44
350	2.48	1000	3.57
NOTES: [1]The heat loss from cylinders larger than 1000 litres should not exceed $(16.66 + 8.33 \times V^{0.4})/(1000 \times 24)$ where V is the volume in litres.			

4.26 Hot water storage vessels should comply with all of the following.

a. Copper hot water storage combination units should comply with **BS 3198**.
b. Vented cylinders should comply with the heat loss and heat exchanger requirements of **BS 1566-1** or **BS EN 12897** as appropriate.
c. Unvented hot water storage system products should comply with **BS EN 12897**.

4.27 Primary storage systems should meet the insulation requirements of the Hot Water Association's *Performance Specification for Thermal Stores.*

Heat interface units

4.28 Vessels that store heated water for a heating or domestic hot water system should have standing losses that are a maximum of the heat loss given in Table 4.5 for that system type.

Requirement L1(b)(i) and (ii): Fixed building services efficiency and controls

This approved document deals with the requirements of Part L1(b)(i) and (ii) of Schedule 1 to the Building Regulations 2010.

[regulations will be amended as necessary in line with the intention sections below]

Schedule 1 – Part L Conservation of fuel and power

L1. Reasonable provision shall be made for the conservation of fuel and power in buildings by:

(a) limiting heat gains and losses–

(i) through thermal elements and other parts of the building fabric; and

(ii) from pipes, ducts and vessels used for space heating, space cooling and hot water services;

(b) providing fixed building services which–

(i) are energy efficient;

(ii) have effective controls; and

(iii) are commissioned by testing and adjusting as necessary to ensure they use no more fuel and power than is reasonable in the circumstances.

Intention

In the Secretary of State's view, requirement L1(b) (i) and (ii) are met in a new dwelling by achieving all of the following:

a. providing fixed building services which meet the minimum efficiencies in **Section 6**
b. providing controls to fixed building services that both:
    i. meet the general controls for heating and hot water systems in paragraphs 5.7 to 5.14
    ii. meet system specific controls in **Section 6**.
c. any Building Automation and Control Systems and on-site electricity generation systems provided meet both a. and b.

In the Secretary of State's view, requirement L1(b) (i) and (ii) are met in an existing dwelling by achieving all of the following:

a. any fixed building services installed meet the minimum efficiencies in **Section 6** and the criteria in paragraph 5.4.
b. any fixed building services installed have controls to fixed building services that both:
    i. meet the general controls for heating and hot water systems in paragraphs 5.7 to 5.22
    ii. meet system specific controls in **Section 6**.
c. any Building Automation and Control Systems and on-site electricity generation systems provided meet both a. and b.

Regulation for self-regulating devices

This approved document deals with the requirements of [the regulation for self-regulating devices] of the Building Regulations 2010.

Self-regulating devices

Regulation to transpose the requirement of Article 8(1) of the energy performance of buildings directive:

[Member states shall require new buildings, where technically and economically feasible, to be equipped with self-regulating devices for the separate regulation of the temperature in each room or, where justified, in a designated heated zone of the building unit. In existing buildings, the installation of self-regulating devices shall be required when heat generators are replaced, where technically and economically feasible.]

Intention

In the Secretary of State's view [the regulation for self-regulating devices] is met in a new dwelling by achieving both of the following.

a. Self-regulating devices are installed where technically and economically feasible, as set out in paragraphs 5.16, 5.18 and 5.19.
b. Self-regulating devices provide separate regulation of the temperature in either:
    i. each room
    ii. where justified in accordance with paragraph 5.18, in a designated heated zone of the building unit.

When a heat generator is replaced in an existing dwelling, in the Secretary of State's view [the regulation for self-regulating devices] is met by achieving both of the following.

a. Self-regulating devices are installed where technically and economically feasible, as set out in paragraphs 5.17 to 5.19.
b. Self-regulating devices provide separate regulation of the temperature in either:
    i. each room
    ii. where justified in accordance with paragraph 5.18, in a designated heated zone of the building unit.

Section 5: Minimum building services efficiencies and controls – general guidance

*[**Note for consultation:** This consultation regards work to existing dwellings, with relevant guidance highlighted in blue. Guidance for new dwellings is provided only for reference].*

New building services

5.1 Each new fixed building service, in a new or existing dwelling, should be at least as efficient as the value set out in **Section 6.** If a proposed service is not covered in **Section 6**, it should be demonstrated that it is no less efficient than a comparable service that is covered.

NOTE: Minimum efficiencies for building services products are also set under the *Ecodesign for Energy-Related Products Regulations 2010* (as amended).

5.2 Both of the following apply to the efficiency claimed for a fixed building service.

a. The efficiency should be based on the appropriate test standard set out in **Section 6**.
b. The test data should be certified by a notified body.

5.3 For heating and hot water systems in new dwellings, paragraphs 5.7 to 5.19 should be followed, in addition to system specific guidance in **Section 6.**

Replacement building services in existing dwellings

5.4 A replacement fixed building service should be at least as efficient as the value set out in **Section 6** and should either:

a. use the same fuel as the service being replaced and have a seasonal efficiency not worse than that of the service being replaced
b. use a different fuel than the service being replaced. The system should both:
    i. not produce more CO_2 emissions per kWh of heat than the appliance being replaced
    ii. not produce more primary energy per kWh of heat than the appliance being replaced.

For example:
Replacing an old LPG boiler with emissions of 0.241 kgCO_2/kWh and primary energy of 1.141 kWh$_{PE}$/m^2/year at 70% efficiency with an oil-fired boiler with emissions of 0.298

kgCO_2/kWh and primary energy of 1.18 kWh$_{PE}$/m^2/year at 90% efficiency.

CO_2 emissions

LPG boiler: 0.241/0.70 = 0.34 kgCO_2/kWh

Oil boiler: 0.298/0.90 = 0.33 kgCO_2/kWh

Primary energy

LPG boiler: 1.141/0.70 = 1.63 kWh$_{PE}$/m^2/year

Oil boiler: 1.18/0.90 = 1.31 kWh$_{PE}$/m^2/year

In this instance, the oil boiler has both lower CO_2 emissions and primary energy than the LPG boiler being replaced, and therefore complies.

NOTE: If the efficiency of the appliance being replaced is not known, Tables 4a and 4b from the Standard Assessment Procedure should be used but with no adjustments from tables 4c and 4d. CO_2 emission factors and Primary Energy factors should be taken from Table 12 of the Standard Assessment Procedure.

5.5 If renewable technology such as a wind turbine or photovoltaic array is being replaced, the new system should have an electrical output that is at least that of the original installation.

5.6 For heating and hot water systems replacements, paragraphs 5.17 to 5.23 should be followed, in addition to system specific guidance in **Section 6**. Consideration should be given to connect to any local district heat networks (for example, providing capped off connections in pipework to allow subsequent connection to a local district heat network).

Heating and hot water systems

Sizing space heating systems

5.7 The specification of space heating systems should be based on an appropriate heat loss calculation for the building, based on the manufacturer's instructions, and a sizing methodology that takes account of the properties of the dwelling, such as The Energy Saving Trust's *CE54 Domestic Heating Sizing Method* or the Chartered Institute of Plumbing and Heating Engineering's *Plumbing Engineering Services Design Guide*. Systems should not be significantly oversized. In most circumstances this means that the heating appliance should not be sized for more than 120 per cent of the design heating load.

5.8 Where a wet heating system is being newly installed or fully replaced in an existing dwelling, including both the heating appliance and the emitters, the system should be sized to allow the space heating system to operate effectively, and in a manner which meets the heating needs of the dwelling, at a flow temperature of 55°C or lower. Where it is not feasible to install a space heating system which can operate at this temperature (for example, where there is insufficient space for larger radiators, or the existing distribution system is provided by higher temperature heat from a low carbon district heat network) the space heating

system should be designed to the lowest design temperature possible which will still meet the heating needs of the dwelling.

NOTE: Low temperature requirements apply to space heating only. Further guidance can be found in The Building Research Establishment's *Design of low-temperature domestic heating systems (FB59).*

Sizing domestic hot water systems

5.9 Domestic hot water systems should be sized for the anticipated domestic hot water demand of the building, based on **BS EN 12831-3** or the Chartered Institute of Plumbing and Heating Engineering's *Plumbing Engineering Services Design Guide.* Systems should not be significantly oversized.

NOTE: For temperature limits to control legionella bacteria in domestic hot water systems, see Approved Document G (sanitation, hot water safety and water efficiency).

Controls and zoning

5.10 For wet heating systems in new dwellings with a floor area of 150m^2 or greater, a minimum of two independently controlled heating circuits should be provided.

5.11 System controls should be wired so that when there is no demand for space heating or hot water, the heating appliance and pump are switched off.

5.12 Domestic hot water circuits that are supplied from a hot water store should have both of the following.

a. Time control which is independent of space heating circuits.
b. Electronic temperature control.

5.13 Primary hot water circuits for domestic hot water or heating should have fully pumped circulation where this is compatible with the heat generator.

5.14 Wet heating systems should ensure a minimum flow of water to avoid short-cycling.

5.15 For space heating systems, both:

a. electric temperature control should be installed for the heating appliance.
b. all heat emitters except those in the reference room should be fitted with individual controls such as thermostatic radiator valves.

Self-regulating devices

5.16 In new dwelling, each room or, where justified in accordance with paragraph 5.18, a heating zone, must be provided with self-regulating devices for the separate control of heating in the room/zone. The installation of self-regulating devices should follow guidance in paragraph 5.19.

NOTE: There is no need to install self-regulating devices for rooms without heating.

5.17 For work in existing dwellings, when a heat generator, such as a boiler, is replaced, self-regulating devices must be installed - where technically and economically feasible - for the separate control of heating in each room served by the heat generator. Alternatively, where justified in accordance with paragraph 5.18, heating may be controlled for each heating zone rather than individual rooms. The installation of self-regulating devices should follow guidance in paragraph 5.19.

NOTE: Where it is not technically feasible to install self-regulating devices the requirement does not need to be met. This includes, but is not limited to:

a. Buildings with very low heat demand (e.g. <10W/m^2).
b. Homes with buffer zones for heat absorption or dissipation with high thermal mass.

NOTE: In normal circumstances, the installation of thermostatic radiator valves in wet central heating systems is likely to be economically feasible.

5.18 It may be justified to control a heating zone rather than individual rooms where any of the following apply.

a. In single-storey, open-plan dwellings in which the living area is greater than 70 per cent of the total floor area, sub-zoning of temperature control might not be appropriate. In such cases, the dwelling should be considered as a single heating zone.
b. Where two adjacent rooms have a similar function and heating requirements (e.g. kitchen and utility room).

NOTE: It might not be possible to equip some heating system types with self-regulating devices for the control of individual rooms. Such systems must only be used where controlling a whole heating zone can be justified.

NOTE: Commissioning heating systems is covered in **section 8**.

5.19 The requirement for self-regulating devices may be satisfied by providing any of the following.

a. An individual networked heat emitter control for each emitter.
b. Both of the following.
    i. A thermostat in a room that the heating circuit serves.
    ii. An individual self-regulating device for each heat emitter, such as a thermostatic radiator valve, on all heat emitters outside the room which contains the thermostat. TRVs should not be located in the same room as the thermostat.
c. An individual room/ heating zone thermostat or fan coil thermostat for each room/ heating zone.
d. Any other controls which meet the function of [the regulation for self-regulating devices].

Controls in existing heating and domestic hot water systems

5.20 In addition to paragraphs 5.16 to 5.19, work on existing systems should incorporate the controls given in paragraphs 5.21 to 5.23.

5.21 If domestic hot water and space heating are controlled by a single time controller in the existing system, then these may continue to be controlled together after the work is complete. Otherwise, domestic hot water and space heating should each have separate time controls.

5.22 If work is carried out on a system which includes a boiler, a boiler interlock should be installed.

5.23 If replacing a boiler, the boiler controls are considered to be part of the boiler installation and should therefore meet the standards in **Section 6** for the relevant wet heating system.

Section 6: System specific guidance

Gas-fired heating systems

6.1 In addition to meeting the general requirements for heating and hot water systems in **Section 5**, a gas-fired heating system should either:

a. for new dwellings, meet the minimum efficiencies in Table 6.1. Table 6.1 sets out minimum standards for services likely to be installed in new dwellings. If a service is not covered in this table then it should either meet the efficiencies set out in Table 6.2 or an equivalent standard.

b. for existing dwellings, meet the minimum efficiencies in Table 6.2.

NOTE: The minimum system efficiency in Table 6.1 might need to be improved upon to meet the Target Emission Rate and Target Primary Energy Rate for the building. This table sets out minimum standards for services likely to be installed in new dwellings. If a service is not covered in this table then it should either meet the efficiencies set out in Table 6.2 or an equivalent standard.

Table 6.1 Minimum efficiencies for gas-fired heating systems in new dwellings

System type	Minimum efficiency
Wet Heating (e.g. radiators or underfloor heating)	92% (as defined in ErP[1])

Table 6.2 Minimum efficiencies for gas-fired heating systems in existing dwellings

System type	Minimum efficiency	Notes
Wet Heating (e.g. radiators or underfloor heating)	92% (as defined in ErP[1])	Or, in exceptional circumstances in existing buildings SEDBUK 2009 efficiencies as follows[2]: • 78% for natural gas • 80% for LPG Follow paragraph 6.2.
Range cooker with integral central heating boiler	75% (as defined in SEDBUK 2009)	Follow paragraph 6.3.

Warm air heating	**BS EN 778** or **BS EN 1319**	If a gas-fired circulator is incorporated for domestic hot water its full and part load efficiency should meet **BS EN 483:1999+A4:2007** Follow paragraph 6.4.
Independent space heating appliance for primary and secondary space heating	63% gross 70% net	Gross efficiency using the following standards as appropriate: • **BS EN 1266** • **BS 7977-1** • **BS EN 613** • **BS EN 13278** Follow paragraph 6.5.
Inset live fuel-effect combined fire/backboiler	45% for natural gas 46% for LPG	Gross efficiency using **BS 7977-2** Follow paragraph 6.6.
All types except inset live fuel-effect combined fire/backboiler	63% for natural gas 64% for LPG	Gross efficiency using **BS 7977-2** as appropriate.
Decorative fuel-effect fires	No minimum efficiency	Meet product standards in **BS EN 509** Follow paragraph 6.7.
NOTES: 1. For Standard Assessment Procedure modelling, SEDBUK values should be used. 2. Exceptional circumstances are defined in the MHCLG's *Guide to the Condensing Boiler Installation Assessment Procedure for Dwellings.*		

6.2 If a gas-fired combination boiler is installed in an existing dwelling, at least one of the following energy efficiency measures, appropriate to the system, should be installed.

a. Flue gas heat recovery.
b. Weather compensation.
c. Load compensation.
d. Smart thermostat with automation and optimisation.

6.3 If a gas-fired range cooker with an integral central heating boiler (within a single appliance body) is provided as part of a new system or replacement component in an existing dwelling, the appliance should have two independently controlled burners (one for the cooking function, and one for the boiler).

NOTE: This paragraph does not apply to appliances with fully independent boiler and cooker parts within a shared case. In this case, the boiler should be treated in the same way as a conventional gas-fired boiler.

6.4 If a gas-fired warm air system is installed in an existing dwelling, all the following should apply.

a. Installed in accordance with **BS 5864.**
b. All new or replacement ductwork should be insulated in accordance with **BS 5422.**
c. Where controls are external to the heater, the system should be provided with a time switch/programmer and room thermostat, or programmable room thermostat.
d. Where controls are integrated in the heater, the system should be provided with a time switch/programmer and room temperature sensor linked to heater firing and fan speed control.

e. Independent temperature control of the hot water circuit should be implemented with a cylinder thermostat and a timing device, wired such that when there is no demand for hot water both the pump and circulator are switched off.
f. The guidance for self-regulating devices in paragraphs 5.17 to 5.19 should be met.

6.5 If a gas-fired fixed independent space heating appliance is installed in an existing dwelling, either:

a. an appliance for primary space heating should meet the standards i to iv below
b. an appliance for secondary space heating should meet one or more of the standards below:
   - **i. BS EN1266**
   - **ii. BS 7977-1**
   - **iii. BS EN 613**
   - **iv. BS EN 13278**
   - **v. BS EN 14829**
   - **vi. BS EN 449.**

For new systems each appliance should be capable of controlling the temperatures independently in areas that have different heating needs (e.g. separate sleeping and living areas). In existing systems, temperature controls should be upgraded to the standards for new systems, and meet the guidance for self-regulating devices in paragraphs 5.17 to 5.20.

6.6 If a gas fire is provided as a secondary heat source as part of a combined fire and back boiler unit in an existing system, the standards in **BS 7977-2** should be met.

6.7 Where a gas-fired fixed decorative fuel-effect fire is installed in an existing dwelling, both the following should apply:

a. the standards in **BS EN 509** should be met
b. There should be a maximum of one appliance per 100 m^2 of dwelling floor area.

Oil-fired heating systems

6.8 In addition to meeting the general requirements for heating and hot water systems in **Section 5,** an oil-fired heating system provided as part of a new system or replacement component in an existing dwelling should meet the minimum efficiencies in Table 6.3.

Table 6.3 Minimum efficiencies for oil-fired heating systems in existing dwellings

System type	Minimum efficiency	Notes
Wet heating – regular boiler	91% (as defined in ErP[1])	Or, in exceptional circumstances[2] in existing buildings 84% SEDBUK 2009.
Wet heating – combi-boiler	86% (as defined in SEDBUK 2009)	Or, in exceptional circumstances[2] in existing buildings 82%.
Range cooker with integral central heating boiler	80%	Follow paragraph 6.9.
Continuously burning vaporising appliance providing secondary heating or hot water	-	Follow paragraph 6.10.

Fixed independent space heating	60% (as given in OFTEC's *OFS A102:2004* and converted using Table E4 of the Standard Assessment Procedure)	

NOTES:

1. For Standard Assessment Procedure modelling, SEDBUK values should be used.
2. Exceptional circumstances are defined in MHCLG's *Guide to the Condensing Boiler Installation Assessment Procedure for Dwellings*.

6.9 If an oil-fired range cooker with an integral central heating boiler (within a single appliance body) is part of a new system or replacement component in an existing dwelling, the appliance should have two independently controlled burners (one for the cooking function, and one for the boiler).

NOTE: This paragraph does not apply to appliances with fully independent boiler and cooker parts within a shared case. In this case, the boiler should be treated in the same way as a conventional gas-fired boiler.

6.10 If a continuously burning oil-fired vaporising appliance is provided for secondary heating or hot water, either of the following should apply.

a. For a manually operated appliance, no further control is required above the integral manual controls that the appliance manufacturer provided.
b. For an electrically operated appliances, an integral remote or thermostatic control should be provided.

NOTE: This guidance does not apply to appliances that have been converted from another fuel.

Electric space heating systems

NOTE: Electric resistance heating is assumed to be 100 per cent efficient, therefore no minimum efficiency is set for these types of system. This section of the guidance does not cover either of the following.

a. Electric heat pumps (guidance is provided in paragraphs 6.33 to 6.37)
b. Portable electric heating devices.

6.11 In addition to meeting the general requirements for heating and hot water systems in **Section 5**, electric heating systems should follow paragraphs 6.12 to 6.14.

6.12 If an electric storage heater is installed, automatic control of input charge should be provided for electric storage heaters. Temperature control should operate by adjusting the rate of heat release from the appliance, using an adjustable damper or other thermostatically controlled method.

6.13 If an electric panel heater is installed or provided as a replacement component, time and temperature control should be provided to allow separate control for either of the following.

a. Each room.
b. Each appliance, where this meets the guidance for self-regulating devices in

paragraphs 5.17 to 5.20.

6.14 If an electric warm air system is installed or provided as a replacement component provided, both of the following should be provided.

a. a programmable room thermostat or a time switch and room thermostat.
b. separately controllable heating zones which meet the guidance for self-regulating devices in paragraphs 5.16 to 5.19.

Solid fuel heating systems

6.15 Solid fuel appliances in new and existing dwellings should have a minimum efficiency (gross calorific value) as specified in Table 6.4 for the category of appliance.

6.16 If a solid fuel appliance used to deliver primary heating as part of a central heating system is in one of the following categories from Table 6.4:

a. D1/2/3/4
b. F
c. G2
d. J2
e. J5.

then, the system should comply with all of the following.

a. Meet the general requirements for heating and hot water systems in **Section 5**.
b. Have separate time control for space heating and hot water circuits.
c. Have automatic control of the burning rate.
d. Follow the manufacturer's instructions on the size and position of radiators designed to keep the system operating effectively by leaking heat (known as heat leak radiators).

6.17 For central heating systems in which a solid fuel appliance is installed as part of a new system or as a replacement component in an existing dwelling, the appliance should both:

a. be from categories D, F, G and J
b. have a ratio of room heat to water heat appropriate for the room and total property.

Table 6.4 Solid fuel appliance categories and minimum efficiencies

Category[1]	Appliance description	Minimum efficiency (gross calorific value)	Feed-type
D1/2/3/4	Open fire and high output boiler	63%	Batch
E1/2/3	Dry room heater – wood or multi-fuel	65%	Batch/auto
E4	Dry room heater – pellet stove	65% part load 70% nominal load	Auto
F	Room heater with boiler	67% (mineral fuels and wood logs)	Batch/Auto

		70% (wood pellets – part load) 75% (wood pellets – nominal load)	
G1	Cooker without boiler not exceeding 3.5 kW	55% (wood fuels)	Batch
G2	Cooker without heating boiler exceeding 3.5 kW	60% (wood fuels)	Batch
J2	Independent boiler – wood logs only	75%	Batch
J5	Independent boiler – wood/pellets/chips	75% nominal load 70% part load	Auto
NOTES: 1. Refers to the categories as set out in HETAS' *The Official Guide to HETAS Approved Products and Services, 2017.*			

Community heating systems

6.18 Paragraphs 6.19 to 6.24 apply where work involves connecting dwellings to a new or existing district heat network or community heating system that achieves both of the following.

a. Supplies 15 or more dwellings from a central source such as a boiler, combined heat and power unit, or heat pumps.
b. Distributes heat from the central source.

6.19 The central heat source should comply with the requirements in **Approved Document L: Volume 2: Buildings other than Dwellings** except where specified in this section.

Connecting existing dwellings to an existing district heat network or community heating system

6.20 When connecting to an existing district heat network or community heating system, the carbon intensity and primary energy of the system should be assessed, and the guidance in paragraph 5.4 should be met. Emission factors and primary energy factors should be determined by a suitably qualified person, based on the particular details of the system, and taking account of the annual average performance of the whole system, including distribution circuits and all the heat generating plant, combined heat and power, waste heat recovery, heat dumping, and evidence of future changes to the heat source, for example, replacing or adding new heat generating equipment

Minimising energy used by pumps

6.21 For new community heating systems, both of the following should apply.

a. The design temperature difference for the community heating primary circuit should be a minimum of 20°C.
b. Variable volume control systems should be used to reduce the volume of water and the pressure difference required from the pumps under part load.

Controls

6.22 For wet heating systems, the maximum design flow rate into the dwelling's heating system should be limited by suitable control and balancing valves to maintain the overall balance in the network and to avoid excessive pumping energy.

6.23 For new district heat networks or community heating systems, the domestic hot water system should be controlled using variable volume controls designed to maintain low return temperatures in the primary community heating circuit.

Metering

6.24 District and community heating systems should be designed to accommodate heat meters for each dwelling at the point of installation.

Underfloor heating systems

Zoning and Controls

6.25 In addition to meeting the general requirements for heating and hot water systems in **Section 5,** all of the following apply to new underfloor heating systems.

a. All floor heating systems should be fitted with controls to adjust the operating temperature.
b. Room thermostats for electric underfloor heating systems should have a manual override feature.
c. Thick screed floor heating systems (>65 mm) should have facilities to automatically adjust the room temperature to a lower level at night or when the room is unoccupied.
d. Heat loss should be minimised by following paragraphs 6.26 to 6.29.

Minimising heat losses

6.26 Ground floors and those in contact with the outside should be insulated to limit heat losses to not more than 10 W/m^2. The heat loss from the floor should be calculated using the sum of the thermal resistance of the floor finish and the underlying heated layer, multiplied by 10.

6.27 Floor heating systems intended for intermittent or cyclical operation or installed over unheated rooms should be separated from the structural floor by a layer of thermal insulation of at least 1.25 (m^2.K)/W.

6.28 The intermediate floor should have a separating layer of system thermal insulation with thermal resistance of one of the following.

a. As in paragraph 6.26.
b. As specified in **BS EN 1264-4**, in one of the following scenarios.
   i. For electric systems, of not less than 0.5 (m^2.K)/W.
   ii. For wet systems, of not less than 0.75 (m^2.K)/W.

6.29 Distribution pipework which does not provide useful heat to a room should be insulated to the standards of paragraph 4.16.

Specific standards for electric underfloor heating

6.30 Electric cables for underfloor heating should be installed within screeds as follows.

a. For direct-acting systems, within screeds not exceeding 60mm.

b. For night energy storage systems, within screeds of at least 65mm.

6.31 Where electric cable underfloor heating night energy storage systems are used, both of the following should apply.

a. A minimum of 20% of the floor area of the dwelling should have fast-response systems such as panel heaters.

b. Controls should be installed which are designed to modify the input charge in response to both of the following.

i. The room thermostat.

ii. Floor temperature sensing.

6.32 Programmable room thermostats with an override feature should be provided for all direct-acting zones of the electric underfloor heating system with air and floor temperature sensing capabilities, to be used individually or combined.

Heat pump heating systems

NOTE: Where the heat pump provides comfort cooling, guidance is also given in paragraphs 6.43 to 6.45.

6.33 Electrically driven air-to-air heat pumps with an output less than or equal to 12 kW should have a seasonal coefficient of performance as defined by Ecodesign Commission Regulation No 206/2012 Annex II, average rating conditions.

6.34 Other types of heat pump should have a coefficient of performance that meets both of the following requirements.

a. For space heating, a minimum of 3.0 for space heating in a new or existing dwelling

b. A minimum of 2.0 for heating domestic hot water.

6.35 In addition to meeting the general requirements for heating and hot water systems in **Section 5**, the heat pump unit should include controls to do all of the following.

a. Control water pump operation (internal and external as appropriate).

b. Control both of the following.

i. Water temperature for wet systems.

ii. Air temperature for air systems.

c. Control outdoor fan operation for air-to-water and air-to-air units.

d. Provide defrost control of external airside heat exchanger for air-to-water and air-to-air systems.

e. Control secondary heating (if fitted) on air-to-air systems.

f. Protect for water flow failure.

g. Protect for high water temperature.

h. Protect for high refrigerant pressure.

i. Protect for air flow failure on air-to-water and air-to-air units.

6.36 External heat pump controls should include both of the following.

a. Weather compensation or internal temperature control.

b. Timer or programmer for space heating.

6.37 Heat pumps should be designed and installed in accordance with the technical standards given in the Microgeneration Certification Scheme's *Microgeneration Installation Standard: MIS 3005*, subject to the limitations on scope as outlined in this standard.

Solar water heating systems

NOTE: The guidance for solar water heating in this document applies to indirect solar systems that supply domestic hot water and have both of the following.

a. A solar collector area of less than 20 m^2.
b. A solar heated water storage volume of less than 440 litres.

6.38 New solar hot water collectors should be independently certified as complying with all required tests according to **BS EN 12975-1** for both of the following.

a. Thermal performance.
b. Reporting and identification.

6.39 The electrical input power of the primary pump in the solar system should be less than the higher of the following.

a. 50 Watts.
b. per cent of the peak thermal power of the collector

6.40 For a heat exchanger between a solar primary and secondary system, a minimum of 0.1 m^2 or equivalent of heat exchanger area should be provided or every 1 m^2 of the net absorber area of the solar collector, or equivalent.

6.41 For work on new or existing solar water heating system, controls should be fitted or upgraded to solar domestic hot water systems to do all of the following.

a. Maximise the useful energy gain from the solar collectors.
b. Minimise the accidental loss of stored energy.
c. Ensure that hot water produced by back-up sources is not used when adequate solar pre-heated water is available.
d. Provide a means to control the adverse effects of excessive temperatures and pressures.
e. Where a separate domestic hot water heating appliance is pre-heated by a solar system, the appliance should be controlled to add no extra heat if the target temperature is met from the solar pre-heated vessel.

6.42 The ratio of the storage volume of solar heated water to the area of the collector should be either of the following.

a. The dedicated solar storage volume should be a minimum of 25 litres per net square metre of the solar collector absorber area.
b. Alternatively, the dedicated solar storage volume should be a volume equivalent to at least 80 per cent of the daily hot water demand (as defined by the Standard Assessment Procedure).

Space and comfort cooling

6.43 The specification of space cooling systems should be based on an appropriate heat gain calculation for the building, based on CIBSE's Design Guide A and by following the manufacturer's guidance. Systems should not be significantly oversized. In most circumstances this means that the cooling appliance should not be sized for more than 120% of the design cooling load.

6.44 The seasonal energy efficiency ratio of an air conditioner working in cooling mode should be a minimum of 4.0.

6.45 Fixed air conditioners should have a minimum energy efficiency classification of Class C in Schedule 3 of the labelling scheme adopted under the *Energy Information (Household Air Conditioners) (No 2) Regulations.*

6.46 Comfort cooling/air-conditioning systems should have both of the following controls.

a. For each control zone and for each terminal unit, it should be possible to independently control both of the following:
   i. timing control
   ii. temperature control.

b. If both heating and cooling are provided in the same space, the controls should prevent them operating simultaneously.

6.47 For centralised cooling systems, follow the guidance in **Approved Document L, volume 2: Buildings other than dwellings**.

6.48 Exposed refrigeration pipework should be both of the following.

a. Insulated.

b. Enclosed in protective trunking.

Mechanical ventilation

6.49 The specification of ventilation systems should be based on the ventilation needs of the building, in accordance with **Approved Document F**. Systems should be designed so that they can be commissioned to suitable ventilation rates so that spaces are not significantly overventilated.

6.50 For new or existing dwellings, the specific fan power for mechanical ventilation systems should be a maximum of:

a. for intermittent extract ventilation systems: 0.5 W/(l.s)
b. for continuous mechanical extract ventilation systems: 0.7 W/(l.s)
c. for continuous supply ventilation systems: 0.5 W/(l.s)
d. for continuous mechanical supply and extract ventilation systems: 1.5 W/(l.s).

6.51 For new or existing dwellings, all packaged ventilation systems providing both supply and

extract ventilation should be fitted with all of the following.

a. Heat recovery system.
b. Summer bypass (the possibility to bypass the heat exchanger or to control its heat recovery performance).
c. Variable speed controller.

6.52 Ventilation heat recovery systems, where incorporated, should have a minimum efficiency of 73 per cent.

Lighting

6.53 Any fixed lighting should be designed to achieve lighting levels appropriate to the activity in the space, based on the Chartered Institution of Building Services Engineers' *SLL Lighting Handbook or* an equivalent design guide. In many cases, it is likely that householders will be able to choose the lamp installed in the individual space, however, where fixed lighting is provided, spaces should be within an illuminance range recommended in design guidance and should not be over-illuminated.

6.54 Where installed in a new or existing dwelling, each internal light fitting should have lamps with a minimum luminous efficacy of 75 lamp lumens per circuit-watt.

6.55 Where installed in a new or existing dwelling, internal light fittings should have local controls to allow for the separate control of lighting in each space or zone. Controls may be either manual, automatic or a combination of both.

6.56 Where installed in a new or existing dwelling, external light fittings should have both of the following controls.

a. All external light fittings should have automatic controls which switch luminaires off in response to daylight.
b. If the lamp efficacy is 75 lamp lumens or less, external light fittings should have automatic controls which switch luminaires off in response to occupancy. Otherwise manual control is acceptable.

Building Automation and Control Systems

6.57 Where a Building Automation and Control System is installed in a new or existing dwelling, it should have appropriate control capabilities for the dwelling, based on the type of building, its expected use and potential energy savings. The system should be appropriately sized.

6.58 The system should be specified and installed according to the manufacturer's instructions to ensure the overall performance of the system meets a reasonable standard.

6.59 For large or complex buildings, the guidance in **Approved Document L, volume 2: Buildings other than dwellings** should be followed.

On-site electricity generation

6.60 Where on-site electricity generation is installed, such as photovoltaics or battery storage, systems should be sized appropriately for the site, available infrastructure and on-site energy demand.

6.61 The system should be specified and installed according to the manufacturer's instructions to ensure the overall performance of the system meets a reasonable standard.

6.62 If the installation is replacing an existing system, the installed generation capacity of the new

system should not be smaller than the existing system, except where it can be demonstrated that a smaller system would be more appropriate or effective (for example, replacing an existing system with one which is better matched to the building's energy demand).

6.63 On-site generation electricity generation should be provided with controls to allow proper operation of the system without the need for user intervention. This is particularly the case where electricity generation and storage systems are used, such as batteries.

Regulation 43: Pressure testing

This approved document deals with the requirements of regulation 43 of the Building Regulations 2010.

Pressure testing

43. (1) This regulation applies to the erection of a building in relation to which paragraph L1(a)(i) of Schedule 1 imposes a requirement.

(2) Where this regulation applies, the person carrying out the work shall, for the purpose of ensuring compliance with regulation 26 and regulation 26A and paragraph L1(a)(i) of Schedule 1:

(a) ensure that:

(i) pressure testing is carried out in such circumstances as are approved by the Secretary of State; and

(ii) the testing is carried out in accordance with a procedure approved by the Secretary of State; and

(b) subject to paragraph (5), give notice of the results of the testing to the local authority.

(3) The notice referred to in paragraph (2)(b) shall:

(a) record the results and the data upon which they are based in a manner approved by the Secretary of State; and

(b) be given to the local authority not later than seven days after the final test is carried out.

(4) A local authority are authorised to accept, as evidence that the requirements of paragraph (2)(a)(ii) have been satisfied, a certificate to that effect by a person who is registered by the Independent Air Tightness Testing Scheme Limited or the Air Tightness Testing and Measurement Association in respect of pressure testing for the air tightness of buildings.

(5) Where such a certificate contains the information required by paragraph (3)(a), paragraph (2)(b) does not apply.

NOTE: Where the building control body is an approved inspector, see regulation 20 of the Building (Approved Inspectors etc.) Regulations 2010 (as amended).

Intention

In the Secretary of State's view, regulation 43 is met when a dwelling is erected by carrying out pressure testing in accordance with paragraphs 7.2 to 7.4 and 7.6 to 7.8.

In the Secretary of State's view, results from a pressure test must be used to demonstrate compliance with regulation 26 and 26A of the Building Regulations 2010 in accordance with paragraphs 7.5 to 7.7.

In the Secretary of State's view, results from a pressure test must be used to demonstrate compliance with L1(a)(i) of Schedule 1 of the Building Regulations 2010, in accordance with paragraphs 7.1 and 7.6.

Section 7: Air permeability and pressure testing

7.1 The minimum standard for air permeability of a new dwelling is in Table 4.1 of **Section 4.**

7.2 The developer should provide a building control body with evidence that test equipment has been calibrated using a UKAS-accredited facility, either:

a. within the previous 12 months

b. at a period in accordance with manufacturer's guidance.

7.3 Building control bodies may accept a pressure test certificate as evidence that the building complies with Regulation 43 of the Building Regulations.

The building control body should be provided with evidence that the person who pressure-tested the building has both:

a. received appropriate training

b. is registered to test the specific class of building.

7.4 An air pressure test should be carried out on every dwelling.

Showing compliance, and reporting pressure test results

7.5 The Dwelling Primary Energy Rate, Dwelling Emission Rate and Dwelling Fabric Energy Efficiency calculated using the measured air permeability must not be worse than the Target Primary Energy Rate, Target Emission Rate and Target Fabric Energy Efficiency respectively.

7.6 If the criteria in paragraphs 7.1 and 7.5 are not achieved, the dwelling air permeability should be improved. New tests should be carried out until the dwelling achieves the criteria in paragraphs 7.1 and 7.5.

7.7 The results of all pressure tests on dwellings should be reported to the building control body, including any test failures.

Air pressure testing procedure

7.8 Air pressure tests should be performed following the guidance set out in [the approved air tightness testing methodology, TM23, the final version of TM23 will be published in 2021]. The procedures set out in that document have been approved by the Secretary of State.

Requirement L1(b)(iii) and Regulation 44: Commissioning

This approved document deals with the requirements of Part L1(b)(iii) of Schedule 1 to the Building Regulations 2010 and regulation 44.

[regulations will be amended as necessary in line with the intention sections below]

Schedule 1 – Part L Conservation of fuel and power

L1. Reasonable provision shall be made for the conservation of fuel and power in buildings by:

(b) providing fixed building services which–

(i) are energy efficient;

(ii) have effective controls; and

(iii) are commissioned by testing and adjusting as necessary to ensure they use no more fuel and power than is reasonable in the circumstances.

Commissioning

44.—(1) This regulation applies to building work in relation to which paragraph F1(2) of Schedule 1 imposes a requirement, but does not apply to the provision or extension of any fixed system for mechanical ventilation or any associated controls where testing and adjustment is not possible.

(2) This regulation applies to building work in relation to which paragraph L1(b) of Schedule 1 imposes a requirement, but does not apply to the provision or extension of any fixed building service where testing and adjustment is not possible or would not affect the energy efficiency of that fixed building service.

(3) Where this regulation applies the person carrying out the work shall, for the purpose of complying with paragraph F1(2) or L1(b) of Schedule 1, give to the local authority a notice confirming that the fixed building services have been commissioned in accordance with a procedure approved by the Secretary of State.

(4) The notice shall be given to the local authority –

(a) not later than the date on which the notice required by regulation 16(4) is required to be given; or

(b) where the regulation does not apply, not more than 30 days after the completion of the work.

NOTE: Where the building control body is an approved inspector, see regulation 20 of the Building (Approved Inspectors etc.) Regulations 2010 (as amended).

Intention

In the Secretary of State's view, L1(b)(iii) and regulation 44 is met by commissioning fixed building services, Building Automation and Control Systems and on-site electricity generation in accordance with **Section 8**.

Section 8: Commissioning

8.1 Fixed building services, Building Automation and Control Systems and on-site electricity generation must be commissioned to ensure that they use no more fuel and power than is reasonable in the circumstances. The commissioning process should involve testing and adjusting the fixed building services, Building Automation and Control Systems and on-site electricity generation as necessary and in accordance with the manufacturer's instructions.

8.2 A commissioning plan should be produced, identifying both of the following.

a. Systems that need to be tested.
b. How these systems will be tested.

For new dwellings, the commissioning plan should be given to the building control body with the design stage primary energy rate, emission rate and fabric energy efficiency rate calculations.

8.3 A fixed building service, Building Automation and Control System or on-site electricity generation that cannot be adjusted by design, or for which commissioning would not affect energy use, does not need to be commissioned.

Fixed building services, Building Automation and Control Systems and on-site electricity generation that do not require commissioning should be identified in the commissioning plan, along with the reason for them not requiring commissioning.

Notice of completion

8.4 A commissioning notice must be given to the relevant building control body and the building owner confirming that commissioning has been carried out for the installed fixed building services, Building Automation and Control Systems and on-site electricity generation according to a procedure approved by the Secretary of State. The notice should confirm that:

a. That the commissioning plan has been followed.
b. That every system has been inspected in an appropriate sequence and to a reasonable standard.
c. That the test results confirm that performance is reasonably in accordance with the design requirements.

8.5 The notice of completion of commissioning for Regulation 44 should be given as follows.

a. If a building notice or full plans have been given to a local authority building control body, the notice should be given to that building control body within five days of the commissioning work being completed.
b. If the building control body is an approved inspector, the notice should generally be given

to the approved inspector within five days of the work being completed.

c. In other cases, for example, if the work is carried out by a person registered with a competent person scheme, the notice must be given to the building control body within 30 days.

8.6 Where fixed building services, Building Automation and Control Systems and on-site electricity generation that require commissioning are installed by a person registered with a competent person scheme, that person may give the notice of commissioning.

8.7 Until the building control body receives the commissioning notice, it may not consider it appropriate to give a completion/final certificate.

System specific guidance for commissioning

Hot water systems for space and domestic hot water heating

8.6 Before a new heating appliance is installed, all central heating and primary hot water circuits should be thoroughly cleaned and flushed out. A suitable chemical inhibitor should be added to the primary heating circuit to protect against scale and corrosion. Domestic central heating systems should be prepared and commissioned to **BS 7593:2019**.

NOTE: The Benchmark commissioning checklist can be used to show that commissioning has been carried out satisfactorily for the heating and hot water system and its heat generation source.

8.7 In addition to paragraph 8.6, heat pump heating and domestic hot water systems should be commissioned to the Microgeneration Certification Scheme's *MIS 3005*, subject to the limitations on scope as outlined in this standard.

Community heating systems

8.8 For district heat networks and community heating systems, both of the following should be done.

a. Systems should be commissioned to optimise the use of energy for pumping.
b. Flow rates in individual heat emitters should be balanced by either of the following.
   - Using appropriate return temperatures.
   - Using calibrated control valves.

Underfloor heating

8.9 All installed equipment in underfloor heating systems should be commissioned in accordance with **BS EN 1264-4**.

Regulation 40: Providing information and the regulation for energy performance of technical building systems

This approved document deals with the requirements of regulation 40 and [the regulation for technical building systems] of the Building Regulations 2010.

[regulations will be amended as necessary in line with the intention sections below]

Information about use of fuel and power

40. (1) This regulation applies where paragraph L1 of Schedule 1 imposes a requirement relating to building work.

(2) The person carrying out the building work shall not later than five days after the work has been completed provide to the owner sufficient information about the building, the fixed building services and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable in the circumstances.

Technical building systems

Regulation to transpose the requirement of Article 8(9) of the energy performance of buildings directive:

[Member States shall ensure that, when a technical building system is installed, replaced or upgraded, the overall energy performance of the altered part, and where relevant, of the complete altered system, is assessed. The results shall be documented and passed on to the building owner, so that they remain available and can be used for the verification of compliance with the minimum requirements laid down pursuant to paragraph 1 of this Article and the issue of energy performance certificates. Without prejudice to Article 12, Member States shall decide whether to require the issuing of a new energy performance certificate.]

Intention

In the Secretary of State's view, regulation 40 and [the regulation for energy performance of technical building systems] are met when a new building is erected by providing the owner with information about all of the following.

a. Operating and maintenance instructions for fixed building services in accordance with paragraph 9.1 to 9.2.
b. Other important documentation as detailed in paragraph 9.3.
c. Energy performance of building automation and control systems in accordance with paragraph 9.4.

In the Secretary of State's view, regulation 40 and [the regulation for energy performance of technical building systems] are met for when work is carried out on an existing building by providing

the owner with information about both of the following.

a. Operating and maintenance instructions for the work on fixed building services that has been carried out in accordance with paragraphs 9.1 to 9.2.
b. Relevant information for work on existing systems as detailed in paragraphs 9.6 to 9.9.

Section 9: Providing information

Operating and Maintenance instructions

9.1 For new dwellings, and for work to an existing dwelling, operating and maintenance instructions should be provided to the occupiers of the dwelling for any fixed building services, building automation and control systems and on-site electricity generation installed as part of the works. The instructions should contain sufficient information to help the occupiers achieve the expected level of energy efficiency, and to verify compliance with the energy performance requirements of the Building Regulations. The documentation should be all of the following.

a. Easy to understand.
b. Specific to the dwelling.
c. Durable.
d. In an accessible format.

9.2 For new dwellings and for work to an existing dwelling, the operating and maintenance instructions should achieve all of the following.

a. Explain the following for the heating, hot water, ventilation and any other technologies.
    i. What they are.
    ii. What they are for.
    iii. Where they are located, using a floor plan.
    iv. How to operate them.
    v. How to control them, including the location and operation of timers and sensors.
    vi. How to maintain them.
b. Signpost other important documentation, such as appliance manuals.
c. Include a completed commissioning sheet, where relevant.

Additional information for new dwellings

9.3 For new dwellings, a signed copy of the *Buildings Regulations Compliance Report (BREL)* and photographic evidence of the build quality should be provided to the homeowner.

9.4 For new dwellings, the operating and maintenance instructions should signpost both of the following.

a. The BREL, which includes data used in the primary energy, emission and fabric energy efficiency rate calculations.
b. The Recommendations Report generated with the ‘on-construction’ energy performance certificate.

9.5 For new dwellings, the operating and maintenance Instructions should include a Home User Guide. The Home User Guide should contain non-technical advice on how to operate and maintain the home in a healthy and energy efficient manner. The guide must contain advice on how to use the building services efficiently in the following areas:

i. ventilation
ii. heating & domestic hot water
iii. renewable energy (if applicable)
iv. staying cool in hot weather.

A Home User Guide template can be viewed at https://wwww.gov.uk/government/publications/home-user-guide-template.

There is no requirement to follow the layout, format or text used within the example.

9.6 Where building automation and control systems are installed in a new dwelling, information about the energy performance of building automation and control systems must also be given to the building owner.

Additional information for work in existing buildings

9.7 When any building work is carried out, against which **Section 5** and/or **Section 6** of this document sets a standard, the energy performance of the fixed building services, Building Automation and Control System or on-site electricity generation affected by the work must be assessed and documented.

9.8 When installing a complete new or replacement system (for example, replacing a heating system including the heating appliance, pipework and heat emitters) the energy performance of the whole system must be assessed, and the results documented and handed over to the building owner. This documentation may be in any of the following forms and should be accompanied by supporting manufacturers' literature.

a. Full commissioning records for the system, carried out according to **Section 8**.
b. A documented assessment using the Standard Assessment Procedure, such as a new Energy Performance Certificate.
c. A documented assessment of the installed system produced in accordance with the Energy Related Products Directive. For example, a heating system 'fiche'.
d. Another equivalent assessment carried out by a suitably qualified person.

9.9 When carrying out work on an existing system, such as installing or replacing components (for example, replacing a boiler but retaining the pipework and heat emitters) the energy performance of the new components must be assessed and documented and handed over to the building owner. This documentation may be in any of the following forms.

a. Product data sheets produced by the product manufacturer.
b. Other documented results of energy assessment of the product carried out in accordance

with the relevant test standards.

9.10 If carrying out work on an existing system fundamentally alters the energy or CO_2 emissions performance of the system, such as the following.

a. A change in heating fuel for a space heating or domestic hot water system.
b. Extending or expanding the capacity of a space heating, comfort cooling, or ventilation system by over 25% of its capacity before the work.

Then the complete altered system should be assessed and guidance for new or replacement systems in paragraph 9.8 should be followed.

Regulation 23(2) and requirement L1(a): Replacement of thermal elements and limiting heat gains and losses

This approved document deals with the requirements of regulation 23(2) and L1(a) to the Building Regulations 2010.

Requirements for the renovation or replacement of thermal elements

23.—(2) Where the whole or any part of an individual element is proposed to be replaced and the replacement—

(a) constitutes a major renovation; or

(b) (in the case of part replacement) amounts to the replacement of more than 50% of the thermal element's surface area;

the whole of the thermal element must be replaced so as to ensure that it complies with paragraph L1(a)(i) of Schedule 1, in so far as that is technically, functionally and economically feasible.

Requirement	*Limits on application*
Schedule 1 – Part L Conservation of fuel and power **L1. Reasonable provision shall be made for the conservation of fuel and power in buildings by:** **(a) limiting heat gains and losses–** **(i) through thermal elements and other parts of the building fabric; and** **(ii) from pipes, ducts and vessels used for space heating, space cooling and hot water services;** (b) providing fixed building services which– (i) are energy efficient; (ii) have effective controls; and (iii) are commissioned by testing and adjusting as necessary to ensure they use no more fuel and power than is reasonable in the circumstances.	

Intention

In the Secretary of State's view, regulation 23(2) and L1(a) is met for new elements in existing dwellings by replacing a thermal element to the standards in **Section 10**.

Section 10: New elements in existing dwellings including extensions

General

10.1 This Section provides guidance for *new* elements in existing dwellings, which includes all of the following types of work.

a. Providing a new thermal element in an existing dwelling – follow paragraph 10.2 to comply with requirement L1 of Schedule 1 of the Building Regulations.

b. Providing a replacement thermal element in an existing dwelling – follow paragraph 10.2 to comply with regulation 23(2) of the Building Regulations.

c. Replacing windows, doors or rooflights (controlled fittings) in an existing dwelling – follow paragraphs 10.3 to 10.6 to comply with requirement L1 of Schedule 1 of the Building Regulations.

d. Extensions of an existing dwelling - follow paragraphs 10.7 to 10.12 to comply with requirement L1 of Schedule 1 of the Building Regulations.

e. Adding a conservatory or porch to an existing dwelling – follow paragraphs 10.13 to 10.14 to ensure compliance with requirement L1 of Schedule 1 of the Building Regulations.

NOTE: Guidance for renovating elements in existing dwellings is in **Section 11**.

New and Replacement fabric elements

10.2 The minimum standards in Table 4.2 should be met for both of the following.

a. New thermal elements installed in an existing dwelling.
b. Thermal elements constructed as a replacement for existing thermal elements.

10.3 For new and replacement windows, roof windows, rooflights and doors (controlled fittings), if the *entire unit* of a window, roof window, rooflight or door is provided, all the following apply.

a. Units should be draught-proofed.
b. Units should meet the minimum standards given in Table 4.2.
c. Insulated cavity closers should be installed where appropriate.

10.4 Building control bodies may accept as evidence a Window Energy Rating and/or Doorset Energy Rating from a certification scheme that provides a quality assured process and supporting audit trail from calculating the performance of the window through to the window being installed.

10.5 If a window is enlarged or a new one created, either of the following should apply

a. The area of windows, roof windows, rooflights and doors should not exceed 25 per cent of the total floor area of the dwelling.

b. If the area of windows, roof windows, rooflights and doors exceeds 25 per cent of the total floor area of the dwelling, compensating measures should be included elsewhere in the work to improve the energy efficiency of the dwelling.

10.6 The term controlled fitting refers to the entire unit of a window, roof window, rooflight or door, including the frame. Replacing glazing or window or door in its existing frame is not providing a controlled fitting. Such work does not have to meet the energy efficiency requirements.

Extension of a dwelling

10.7 When a dwelling is extended, elements should satisfy all of the following.

a. New thermal elements should meet standards in Table 4.2 and paragraph 4.11.
b. Replacement thermal elements should meet standards in Table 4.2 and paragraph 4.11.
c. New windows, roof windows, rooflights and doors should meet the standards in Table 4.2.
d. The total area of windows, roof windows and doors in extensions should not exceed the sum of:
    i. 25 percent of the floor area of the extension; plus
    ii. the total area of any windows and doors which no longer exist or exposed due to the extension.
e. Existing fabric elements that will become thermal elements should meet the limiting standards in Table 4.3, following paragraphs 11.2 to 11.5.

10.8 When a dwelling is extended any fixed building services, Building Automation and Control Systems or on-site electricity generation that are provided or extended should comply with the guidance in **Section 5** and **6**.

10.9 As an alternative approach to paragraph 10.7, the area-weighted U-value of all the elements in the extension should be demonstrated to be no greater than that of an extension of the same size and shape that complies with paragraph 10.7. This includes the opening area standards in paragraph 10.7 (d).

The area-weighted U-value is given by the following expression.

$$\frac{\{(U1 \times A1) + (U2 \times A2) + (U3 \times A3) + \ldots)\}}{(A1 + A2 + A3 + \ldots)}$$

Where:
U_1 = the U-value of element type 1
A_1 = the area of element type 1
and so on.

10.10 As an alternative approach to paragraphs 10.7 or 10.9, the Standard Assessment Procedure may be used to demonstrate that the Dwelling Primary Energy Rate, the Dwelling Emission Rate and the Fabric Energy Efficiency Rate for the dwelling and proposed extension is not greater than for the building plus a notional extension. The notional extension should be the same size and shape as the proposed extension and comply with paragraph 10.7. The openings in the notional extension should conform with paragraph 10.7 d, with door area set equal to the door area of the proposed extension and the remainder of the openings being classified as windows.

NOTE: Where the performance of elements of the existing building is unknown, data in the Standard Assessment Procedure Appendix S should be used to estimate the performance.

10.11 Consequential improvements may be required when extending an existing dwelling with a total useful floor area of over 1,000 m^2. Guidance in **Section 12** should be followed.

Conservatories and porches

10.12 A conservatory or porch must be thermally separated from the existing dwelling. If the thermal separation is removed, or the dwelling's heating system is extended into the conservatory or porch, the conservatory or porch should be treated as an extension and paragraphs 10.7 to 10.13 should be followed.

10.13 If the conservatory or porch is not exempt from the energy efficiency requirements (see paragraph 0.14), new elements should satisfy all of the following.

a. New thermal elements should meet standards in Table 4.2.

b. Replacement thermal elements should meet standards in Table 4.2.

New windows, roof windows, rooflights and doors should meet the standards in Table 4.2. The limitations on area of windows, doors and rooflights in paragraph 10.7 (d) do not apply.

In addition, both of the following should be satisfied.

a. There should thermal separation between the dwelling and the conservatory or porch, i.e. any walls, doors and windows, should be insulated and draught proofed, to at least the same extent as in the existing dwelling.

b. Fixed building services, Building Automation and Control Systems or on-site electricity generation installed within the extension should meet the standards in **Section 5** and **6** and should provide independent temperature and on/off controls.

Regulation 23(1) and requirement L1(a): Renovating elements in existing buildings and limiting heat gains and losses

This approved document deals with the requirements of regulation 23(1) to the Building Regulations 2010.

Requirements for the renovation or replacement of thermal elements

23.—(1) Where the renovation of an individual thermal element—

(a) constitutes a major renovation; or

(b) amounts to the renovation of more than 50% of the element's surface area;

the renovation must be carried out so as to ensure that the whole of the element complies with paragraph L1(a)(i) of Schedule 1, in so far as that is technically, functionally and economically feasible.

Requirement	*Limits on application*
Schedule 1 – Part L Conservation of fuel and power **L1. Reasonable provision shall be made for the conservation of fuel and power in buildings by:** **(a) limiting heat gains and losses–** **(i) through thermal elements and other parts of the building fabric; and** **(ii) from pipes, ducts and vessels used for space heating, space cooling and hot water services;** (b) providing fixed building services which– (i) are energy efficient; (ii) have effective controls; and (iii) are commissioned by testing and adjusting as necessary to ensure they use no more fuel and power than is reasonable in the circumstances.	

Intention

In the Secretary of State's view, regulation 23(1) and L1(a) is met for work to elements in existing dwellings by renovating a thermal element to the standards in **Section 11**.

Regulations 6 and 22: Material change of use and change to energy status

This approved document deals with the requirements of regulation 6 and 22 of the Building Regulations 2010.

Requirements relating to material change of use

6.

1) Where there is a material change of use of the whole of a building, such work, if any, shall be carried out as is necessary to ensure that the building complies with the applicable requirements of the following paragraphs of Schedule 1—

   a) in all cases, B1 (means of warning and escape), B2 (internal fire spread—linings), B3 (internal fire spread—structure), B4(2) (external fire spread—roofs), B5 (access and facilities for the fire service), C2(c) (interstitial and surface condensation), F1 (ventilation), G1 (cold water supply), G3(1) to (3) (hot water supply and systems), G4 (sanitary conveniences and washing facilities), G5 (bathrooms), G6 (kitchens and food preparation areas), G2 (bathrooms), H1 (foul water drainage), H6 (solid waste storage), J1 to J4 (combustion appliances), **L1 (conservation of fuel and power)**, P1 (electrical safety);

   b) in the case of a material change of use described in regulation 5(c), (d), (e) or (f), A1 to A3 (structure);

   c) in the case of a building exceeding fifteen metres in height, B4(1) (external fire spread—walls);

   d) in the case of a material change of use described in regulation 5(a), (b), (c), (d), (g), (h), (i) or, where the material change provides new residential accommodation, (f), C1(2) (resistance to contaminants);

   e) in the case of a material change of use described in regulation 5(a), C2 (resistance to moisture);

   f) in the case of a material change of use described in regulation 5(a), (b), (c), (g), (h) or (i), E1 to E3 (resistance to the passage of sound);

   g) in the case of a material change of use described in regulation 5(e), where the public building consists of or contains a school, E4 (acoustic conditions in schools);

   h) in the case of a material change of use described in regulation 5(a) or (b), G2 (water efficiency) and G3(4) (hot water supply and systems: hot water supply to fixed baths);

   i) in the case of a material change of use described in regulation 5(c), (d), (e) or (j), M1 (access and use).

2) Where there is a material change of use of part only of a building, such work, if any, shall be carried out as is necessary to ensure that—

   a) that part complies in all cases with any applicable requirements referred to in paragraph (1)(a);

   b) in a case in which sub-paragraphs (b), (e), (f), (g) or (h) of paragraph (1) apply, that part complies with the requirements referred to in the relevant sub-paragraph;

   c) in a case to which sub-paragraph (c) of paragraph (1) applies, the whole building complies with the requirement referred to in that sub-paragraph; and

d) in a case to which sub-paragraph (i) of paragraph (1) applies—

i. that part and any sanitary conveniences provided in or in connection with that part comply with the requirements referred to in that sub-paragraph; and

ii. the building complies with requirement M1(a) of Schedule 1 to the extent that reasonable provision is made to provide either suitable independent access to that part or suitable access through the building to that part.

Requirements relating to a change to energy status

22. Where there is a change to a building's energy status, such work, if any, shall be carried out to ensure that the building complies with the applicable requirements Part L of Schedule 1.

Intention

Regulations 6 and 22 of the Building Regulations set requirements for buildings to comply with Schedule 1 of the Building Regulations when a material change of use or a change to energy status occurs.

In the Secretary of State's view, regulation 6 and 22 are met by following the guidance in **Section 11**.

Section 11: Work to elements in existing dwellings

General

11.1 This Section provides guidance for work to *existing* elements in dwellings, which includes all of the following types of work.

a. Renovating an existing thermal element in an existing dwelling – follow paragraphs 11.2 to 11.5 to comply with regulation 23(1) of the Building Regulations.

b. If a building is subject to a material change of use – follow paragraphs 11.6 to 11.9 to comply with regulation 6 of the Building Regulations.

c. If a building is subject to a change to energy status – follow paragraphs 11.6 to 11.9 to comply with regulation 22 of the Building Regulations.

NOTE: New and replacement elements in existing dwellings should follow guidance in **Section 10.**

Renovating thermal elements

11.2 Renovation of a thermal element means one of the following.

a. Providing a new layer through cladding or rendering the external surface of the thermal element.
b. Providing a new layer through dry-lining the internal surface of a thermal element.
c. Replacing an existing layer through stripping down the element to expose basic structural components (e.g. bricks, blocks, rafters, joists, frame etc.) and then rebuilding.
d. Replacing the water proof membrane on a flat roof.
e. Providing cavity wall insulation.

11.3 If a thermal element is renovated then the whole of the thermal element should be improved to achieve at least the U-value in Table 4.3 column (b), if one of the following applies.

a. More than 50 per cent of the surface of the individual thermal element will be renovated (see paragraph 11.4).
b. The work constitutes a major renovation as defined in paragraph 11.5.

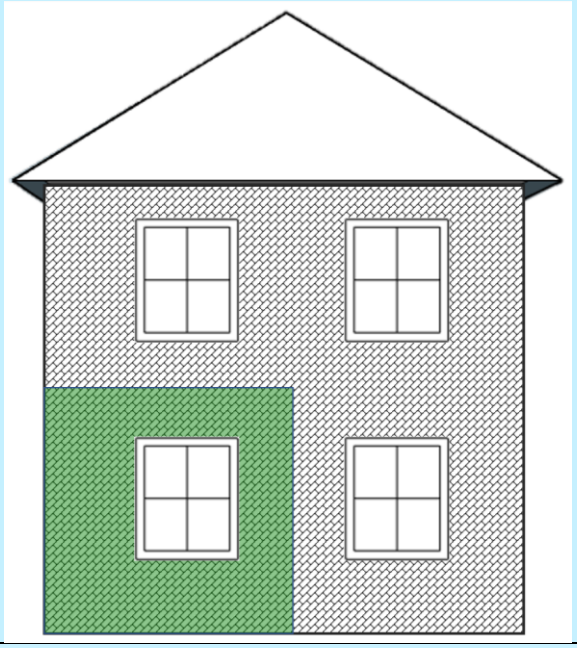
NOTE: If paragraph 4.10 applies**, Appendix C** provides examples of renovating an existing thermal element that is technically, functionally or economically feasible.

11.4 When assessing the percentage area of an individual thermal element that will be renovated, consider whether the element is being renovated from the outside or inside, following Figure 11.1 and Figure 11.2.

11.5 A major renovation is when more than 25% of the surface area of the external building envelope is renovated.

Figure 11.1. Renovation of a thermal element from the outside

For example, if external render is being removed, the area of the thermal element is the area of the elevation in which that wall sits.

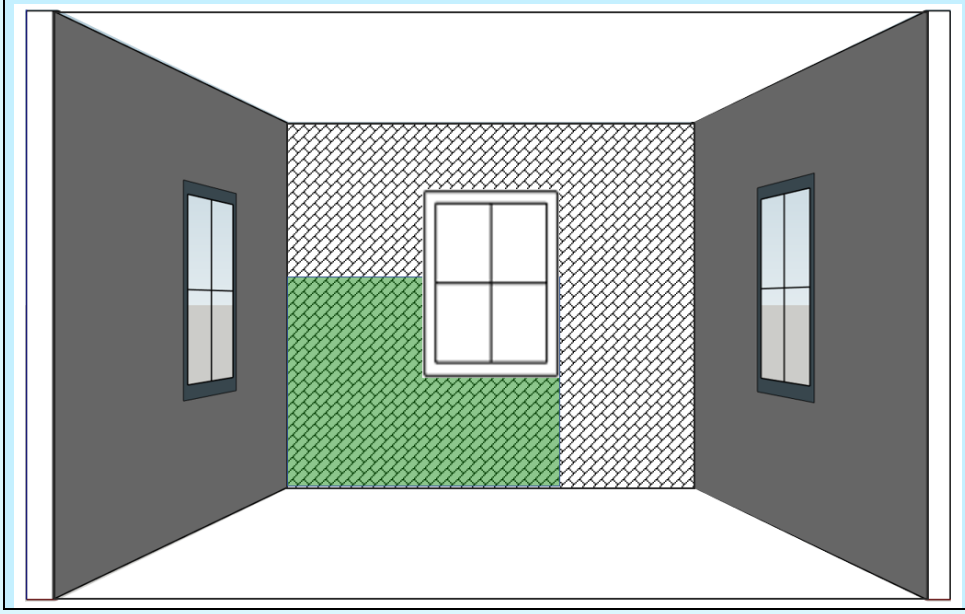


= Area of the thermal element being renovated

= Total area of the thermal element

Figure 11.2. Renovation of a thermal element from the inside

For example, if the plaster is being removed from the inside of a wall, the area of the thermal element is the area of external wall as viewed from inside the room.



= Area of the thermal element being renovated

= Total area of the thermal element

Material change of use and change to energy status

11.6 A material change of use, relevant to dwellings, is when a building:

a. is used as a dwelling, where previously it was not
b. contains a flat, where previously it did not
c. contains a greater or lesser number of dwellings than it did, having previously contained at least one dwelling.

11.7 A change to energy status is when a building was previously exempt from the energy efficiency requirements but now is not. It applies to the building as a whole or parts of the building that have been designed or altered to be used separately. For example, when a previously un-heated space becomes part of the heated dwelling in a garage or loft conversion.

NOTE: A material change of use may result in a change to energy status, for example if a previously unheated loft is converted into a flat.

11.8 If there is a material change of use and/or a change to energy status, elements should satisfy all of the following.

a. Existing thermal elements should meet the limiting standards in Table 4.3, following paragraphs 4.9 to 4.10
b. Existing windows, roof windows, rooflights and doors (controlled fittings) should be replaced to meet the limiting standards in Table 4.2 if they satisfy both of the following.
    i. Separate a conditioned space from an unconditioned space or the external environment.
    ii. Have a U-value worse than either:
        - for windows, roof windows and doors – 3.30 W/(m^2.K)
        - for rooflights – 3.80 W/(m^2.K) following paragraph 4.5.

In addition, all of the following should be satisfied.

a. New or replaced thermal elements should meet standards in Table 4.2.
b. New or replaced windows, roof windows, rooflights and doors (controlled fittings) should meet standards in Table 4.2.
c. The area of openings in the newly created dwelling should not be more than 25 per cent of the total floor area. A larger area of openings may be achieved following paragraph 11.9.
d. Fixed building services, Building Automation and Control Systems or on-site electricity generation provided or extended should meet the standards in **Section 5** and **6.**

11.9 As an alternative to paragraph 11.8, the Standard Assessment Procedure may be used to demonstrate that the primary energy and total CO_2 emissions and from all the dwellings in the building, after the building work, would be no greater than if each dwelling had been improved following the guidance in paragraph 11.8.

Regulation 28: Consequential improvements to energy performance

This approved document deals with the requirements of regulation 28 of the Building Regulations 2010.

Consequential improvements to energy performance

28.— (1) Paragraph (2) applies to an existing building with a total useful floor area over 1000 m^2 where the proposed building work consists of or includes–

(a) an extension;

(b) the initial provision of any fixed building services; or

(c) an increase to the installed capacity of any fixed building services.

(2) Subject to paragraph (3), where this paragraph applies, such work, if any, shall be carried out as is necessary to ensure that the building complies with the requirements of Part L of Schedule 1.

(3) Nothing in paragraph (2) requires work to be carried out if it is not technically, functionally or economically feasible.

NOTE: Where the building control body is an approved inspector, see regulation 20 of the Building (Approved Inspectors etc.) Regulations 2010 (as amended).

Intention

In the Secretary of State's view, where regulation 28 applies, the regulation is met by carrying out consequential improvements that are technically, functionally and economically feasible, following **Section 12.**

Section 12: Consequential improvements

12.1 For an existing dwelling with a total useful floor area of over 1,000 m^2, additional work may be required to improve the overall energy efficiency of the building if proposed work includes any of the following.

a. An extension.
b. Providing any fixed building service in the building for the first time.
c. Increasing the capacity of any fixed building service (other than renewable technology).

12.2 Consequential improvements should be carried out to ensure that the dwelling complies with Part L of the Building Regulations, to the extent that they are technically, functionally and economically feasible.

12.3 Technical guidance is given in **Approved Document L, volume 2: Buildings other than dwellings.**

Appendix A: Key terms

Air permeability is the physical property used to measure airtightness of the building fabric. It is defined as air leakage rate per hour per square metre of envelope area at the test reference pressure differential of 50 pascals (50 N/m^2) or 4 pascals (4 N/m^2).

The limiting air permeability is the worst allowable air permeability.

The design air permeability is the target value set at the design stage.

The assessed air permeability is the value used in establishing the Dwelling Emission Rate and the Dwelling Primary Energy Rate. The assessed air permeability is based on a measurement of the air permeability of the dwelling concerned.

Automation means a control function which automatically adjusts time and temperature settings based on occupancy detection and/or stored data from user adjustments over time.

Building Automation and Control System means a system comprising all products, software and engineering services that can support energy efficient, economical and safe operation of technical building systems through automatic controls and by facilitating the manual management of those building systems.

Building Control Body means a local authority building control department or an approved inspector.

Building Envelope in relation to a building is defined in Regulation 35 as:

> the walls, floor, roof, windows, doors, roof windows and rooflights.

Centre pane U-value means the U-value determined in the central area of the glazing unit, making no allowance for edge spacers or the window frame.

Change to energy status is defined in Regulation 2(1) as:

> Any change which results in a building becoming a building to which the energy efficiency requirements of those Regulations apply, where previously it was not.

Circuit-watt refers to the power consumed in lighting circuits by lamps and, where applicable, their associated control gear (including transformers and drivers) and power factor correction equipment.

Coefficient of performance (COP) is a measure of the efficiency of a heat pump at specified source and sink temperatures, measured using the procedures in **BS EN 14511**:

Heating COP = heat output / power input

% COP (COP×100) is the heat generator efficiency.

Commissioning is the advancement of a fixed building service after all or part of the system has been installed, replaced or altered. The system is taken from a state of static completion to working order. Testing and adjusting, as necessary, ensure that the whole system uses no more fuel and power than is reasonable in the circumstances, without compromising the need to comply with health and safety requirements.
For each system, commissioning includes all of the following:

a. setting-to-work
b. regulation (that is, testing and adjusting repetitively) to achieve the specified performance
c. calibration
d. setting up and testing of the associated automatic control systems
e. recording the system settings and the performance test results that have been accepted as satisfactory.

Community heating systems supply heat from a central source within a single building.

Consequential improvements mean those energy efficiency improvements required by regulation 28.

Controlled service or fitting is defined in Regulation 2(1) as:

> a service or fitting in relation to which Part G (sanitation, hot water safety and water efficiency), H (drainage and waste disposal), J (combustion appliances and fuel storage systems), L (conservation of fuel and power) or P (electrical safety) of Schedule 1 to the Building Regulations imposes a requirement.

District heat networks supply heat from a central source to consumers, via a network of underground pipes carrying hot water. Heat networks can cover a large area or even an entire city, or be fairly local supplying a small cluster of buildings.

Dwelling means a self-contained unit designed to accommodate a single household.

> **NOTE:** Buildings exclusively containing rooms for residential purposes, such as nursing homes, student accommodation and similar, are not dwellings. In such cases, **Approved Document L, volume 2: building other than dwellings** applies.

Dwelling emission rate is the dwelling CO_2 emission rate expressed as $kgCO_2/(m^2 \cdot year)$ and determined using the Standard Assessment Procedure.

Dwelling fabric energy efficiency rate is expressed as $kWh/(m^2 \cdot year)$ and determined using the Standard Assessment Procedure.

Dwelling primary energy rate is expressed as $kWh_{PE}/(m^2 \cdot year)$ and determined using the

Standard Assessment Procedure.

Economically feasible means that the capital cost of the measure will pay back in energy savings in a reasonable time period. For the purposes of this document, economically feasible means that the measure would achieve a simple payback of either:

a. 7 years for the installation of self-regulating devices
b. 15 years for any other measure

Emergency escape lighting means the emergency lighting that illuminates an area for the safety of people leaving that area or for people attempting to terminate a dangerous process before leaving that area.

Energy efficiency requirements are defined in Regulation 2(1) as:

> the requirements of regulations 23, 25A, 25B, 26, 26A, 28 and 40 of, and Part L of Schedule 1 to the Building Regulations.

Energy performance certificate is defined in the Energy Performance of Buildings Directive as:

> a certificate which—
> a) in the case of a certificate entered on the register before 9th January 2013 complied with the requirements of regulation 11(1) of the Energy Performance of Buildings (Certificates and Inspections) (England and Wales) Regulations 2007(d);
> b) in the case of a certificate entered on the register on or after 9th January 2013 complies with the requirements of regulation 9(1) of these Regulations; or
> c) complies with the requirements of regulation 29(e) of the Building Regulations 2010.

Envelope area, or measured part of the building, is the total area of all floors, walls and ceilings bordering the internal volume that is the subject of the pressure test. This includes walls and floors below external ground level. Overall internal dimensions are used to calculate this envelope area and no subtractions are made for the area of the junctions of internal walls, floors and ceilings with exterior walls, floors and ceilings.

Fixed building services are defined in Regulation 2(1) as:

> any part of, or any controls associated with—
> a) fixed internal or external lighting systems (but not including emergency escape lighting or specialist process lighting);
> b) fixed systems for heating, hot water, air conditioning or mechanical ventilation; or
> c) any combination of systems of the kinds referred to in paragraph (a) or (b).

Fixed external lighting means lighting fixed to an external surface of the building and supplied from the occupier's electrical system. It excludes lighting in common areas of blocks of flats and in

other communal accessways.

Flue gas heat recovery means a device which pre-heats the domestic hot water supply by recovering heat from the boiler's flue emissions.

A **heating zone** is a conditioned area of a building which is on a single floor and has the same thermal characteristics and temperature control requirements throughout.

Heating appliance, or **heat generator**, means the part of a heating system that generates useful heat using one or more of the following processes.

a. The combustion of fuels in, for example, a boiler.
b. The Joule effect, taking place in the heating elements of an electric resistance heating system.
c. Capturing heat from ambient air, ventilation exhaust air, or a water or ground heat source using a heat pump.

Lamp lumens means the sum of the average initial (100 hour) lumen output of all the lamps in the luminaire.

Light fitting means a fixed light or a lighting unit, which can comprise one or more lamps and lamp holders, control gear and an appropriate housing. The control gear may be integrated in the lamp or located elsewhere, in or near the fixed light.

Load compensation means a control function which maintains internal temperature by varying the flow temperature from the heat generator relative to the measured response of the heating system.

Major renovation is defined in Regulation 35 as:

the renovation of a building where more than 25% of the surface area of the building envelope undergoes renovation.

Material change of use is defined in Regulation 5 as:

Where there is a change in the purposes for which or the circumstances in which a building is used, so that after that change-

a) The building is used as a dwelling, where previously it was not;
b) The building contains a flat, where previously it did not;
c) The building is used as an hotel or a boarding house, where previously it was not;
d) The building is used as an institution, where previously it was not;
e) The building is used as a public building, where previously it was not;
f) The building is not a building described in classes 1 to 6 in Schedule 2, where previously it was;
g) The building, which contains at least one dwelling, contains a greater or lesser number of dwellings than it did previously;
h) The building contains a room for residential purposes, where previously it did not;
i) The building, which contains at least one room for residential purposes, contains a greater

or lesser number of such rooms than it did previously; or

j) The building is used as a shop, where it previously was not; and

k) The building is a building described in regulation 7(4)(a), where previously it was not.

Primary circulation refers to a assembly of water fittings in which water circulates between a heat source and a primary heat exchanger inside a hot water storage vessel, and includes any space heating system.

Primary energy means energy from renewable and non-renewable sources which has not undergone any conversion or transformation process.

Renewable technology means technology that uses renewable resources, which are naturally replenished on a human timescale, to produce electricity. Resources include wind, wave, marine, hydro, biomass and solar.

Rooflight is defined as a glazed unit installed out of plane with the surface of the roof on a kerb or upstand. They are sometimes referred to as a skylight.

Roof window is defined as a window installed in the same orientation and in plane with the surrounding roof.

Room for residential purposes is defined in Regulation 2(1) as:

> a room, or a suite of rooms, which is not a dwelling-house or a flat and which is used by one or more persons to live and sleep and includes a room in a hostel, an hotel, a boarding house, a hall of residence or a residential home, but does not include a room in a hospital, or other similar establishment, used for patient accommodation.

Seasonal coefficient of performance (SCOP) is a measure of the efficiency of a heat pump over the designated heating season, measured using the procedures in **BS EN 14825**.

Seasonal energy efficiency ratio (SEER) is the total amount of cooling energy provided divided by the total energy input to a single cooling unit, summed over the year.

Secondary circulation refers to an assembly of water fittings in which water circulates in supply pipes or distributing pipes of hot water storage systems.

Secondary heating means a space heating appliance or system which operates separately to the main heating system in the dwelling, and does not provide the majority of heating in the dwelling. For example, a decorative fuel-effect fire in a room which also contains radiators for a central heating system.

Self-regulating device means a device or system that automatically controls the output of heating and/or cooling emitters to independently control the temperature in each room or, (where justified, a heating zone) where heating and/or cooling is provided by a fixed building service.

Specialist process lighting means lighting to illuminate specialist tasks within a space rather than the space itself. Specialist process lighting could include theatre spotlights, projection equipment, lighting in TV and photographic studios, medical lighting in operating theatres and doctors' and dentists' surgeries, illuminated signs, coloured or stroboscopic lighting, and art objects with integral lighting, such as sculptures, decorative fountains and chandeliers.

Standard Assessment Procedure is the current approved procedure for assessing the performance of dwellings in line with this document. The Standard Assessment Procedure is detailed in The Government's *Standard Assessment Procedure for Energy Rating of Dwellings version 10.1.*

Seasonal efficiency of domestic boilers in the UK (SEDBUK) is the methodology for determining boiler efficiency defined in the Standard Assessment Procedure, Appendix D.

Simple payback means the amount of time it will take to recover the initial investment through energy savings, and is calculated by dividing the marginal additional cost of implementing an energy efficiency measure by the value of the annual energy savings achieved by that measure taking no account of VAT. When making this calculation the following guidance should be used:

a. The marginal additional cost is the additional cost (materials and labor of incorporating (e.g.) additional insulation, not the whole cost of the work
b. The cost of implementing the measure should be based on prices current at the date the proposals are made known to the building control body and be confirmed in a report signed by a suitably qualified person
c. The annual energy savings should be estimated using the Standard Assessment Procedure
d. For the purposes of this document, the energy prices that are current at the time of the application to building control should be used when evaluating energy savings. Current prices can be found on the **BEIS website.**

Target emission rate is the maximum CO_2 emission rate for the dwelling, expressed as $kgCO_2/(m^2 \cdot year)$, and determined using the Standard Assessment Procedure.

Target fabric energy efficiency rate is the minimum fabric energy efficiency for the dwelling, expressed as $kWh/(m^2 \cdot year)$ and determined using the Standard Assessment Procedure.

Target primary energy rate is the maximum primary energy use for the dwelling in a year, expressed as $kWh_{PE}/(m^2 \cdot year)$, and determined using the Standard Assessment Procedure.

Technical building systems means any of the following systems:

a. Space heating

b. Space cooling
c. Ventilation
d. Domestic hot water
e. Lighting
f. Building Automation and control Systems
g. On-site electricity generation

Thermal bridging means part of a thermal element that has significantly higher heat transfer than the materials surrounding it.

Thermal element is defined in regulation 2(3) of the Building Regulations as follows:

> 2(3) In these Regulations 'thermal element' means a wall, floor or roof (but does not include windows, doors, roof windows or rooflights) which separates a thermally conditioned part of the building ('the conditioned space') from:
>
> a) the external environment (including the ground); or
> b) in the case of floors and walls, another part of the building which is:
> i. unconditioned;
> ii. an extension falling within class VII in Schedule 2; or
> iii. where this paragraph applies, conditioned to a different temperature,
>
> and includes all parts of the element between the surface bounding the conditioned space and the external environment or other part of the building as the case may be.
>
> 2(4) Paragraph 2(3)(b)(iii) only applies to a building which is not a dwelling, where the other part of the building is used for a purpose which is not similar or identical to the purpose for which the conditioned space is used.

Thermal envelope is the combination of thermal elements of a building which enclose a particular conditioned indoor space or groups of indoor spaces.

Thermal separation between a dwelling and a conservatory means that they are divided by walls, floors, windows and doors for which i) the U-values are similar to, or in the case of a newly-constructed conservatory not greater than, the U-values of the corresponding exposed elements elsewhere in the dwelling; ii) in the case of a newly constructed conservatory, windows and doors have similar draught-proofing provisions as the exposed windows and doors elsewhere in the dwelling.

Total useful floor area is the total area of all enclosed spaces, measured to the internal face of the external walls. When calculating total useful floor area, both:

a. the area of sloping surfaces such as staircases, galleries, raked auditoria and tiered terraces should be taken as their area on plan
b. areas that are not enclosed, such as open floors, covered ways and balconies, should be excluded.

NOTE: This area is the gross floor area as measured in accordance with the guidance issued to surveyors by the Royal Institution of Chartered Surveyors (RICS).

U-value is a measure of the ability of a building element or component to conduct heat from a warmer environment to a cooler environment. It is expressed as the quantity of heat (in watts) that will flow through one square metre of area divided by the difference in temperature (in degrees K) between the internal and external environment, and the unit is $W/m^2.K$.

Weather compensation enables the operating flow temperature of a heating system to be varied. An external sensor communicates with one inside the boiler. The temperature is varied by either of the following.

a. Modulating the heat generator output (direct acting).
b. Using a mixing valve to adjust the flow temperature to the heat emitters.

Appendix B: Reporting evidence of compliance

BREL report

B.1 The standardised Buildings Regulations England Part L (BREL) report and photographic evidence of compliance should be provided to the building control body and to the building owner to demonstrate compliance with the energy efficiency requirements.

B.2 The approved software will produce the BREL report for the building as a standard output option.

B.3 Two versions of the BREL should be produced by the approved software.

a. The first design stage BREL, before commencement of works, to include all of the following.
   i. The target and Dwelling Primary Energy Rate.
   ii. The target and Dwelling Emission Rate.
   iii. A supporting list of specifications.
b. The second, as-built BREL report, to include all of the following.
   i. The target and as-built Dwelling Primary Energy Rate.
   ii. The target and as-built Dwelling Emission Rate.
   iii. A supporting list of specifications and any changes to the list of specifications provided at design stage.

These reports can then be used by the building control body to assist checking that what has been designed is actually built. The report should include a facility to compare the 'as designed' and as built data input files and automatically produces a schedule of changes.

B.4 The as-built BREL report should be signed by the energy assessor to confirm that the as-built calculations are accurate and that the supporting documentary evidence and photographs have been reviewed in the course of preparing the as-built BREL report. (see B.6 and B.7)

B.5 The as-built BREL report should be signed by the developer to confirm that the dwelling has been constructed or completed according to the specifications set out in the report.

Photographic evidence

B.6 Photographs should be taken for each dwelling on a development as a record during the construction of a property. The photographs should be made available to the energy assessor and the building control body. No restrictions are imposed on the persons authorised to take the photographs.

B.7 Photographs should be taken at various construction stages for each detail listed below and should be unique to each property. A minimum of one image should be provided per detail

type although more than one photograph may be necessary (see below). Photographs should include the following minimum details:

1. Foundations/substructure and ground floor to indicate thermal continuity of insulation and quality at
    a. Ground floor perimeter edge insulation
    b. External door threshold
    c. Below damp-proof course on external walls
2. External walls: for each wall type to indicate thermal continuity of insulation, and quality at
    a. Ground floor to wall junction
    b. Structural penetrating elements
3. Roof: for each roof type to indicate thermal continuity of insulation, and quality at
    a. Joist/rafter level
    b. Eaves and gable edges
4. Openings: for each opening type (one image per wall or roof type is sufficient) to indicate thermal continuity of insulation, and quality at
    a. Window positioning in relation to cavity closer or insulation line
    b. External doorset positioning in relation to cavity closer or insulation line
5. Airtightness: additional photos for all details 1-4 to identify airtightness detail (if not included in continuity of insulation image).
6. Building services: for all plant associated with space heating, hot water, ventilation and low or zero carbon technology equipment within or on the building:
    a. Plant/equipment identification label(s) including make/model and serial number
    b. Primary pipework continuity of insulation
    c. Mechanical ventilation ductwork continuity of insulation (for duct sections outside of thermal envelope)

B.9 Photographic images should be digital and of sufficient quality and resolution to allow a qualitative audit of the subject detail. This may require close-up images in areas where a long shot image provides insufficient detail. More than one image of each detail may be necessary. Images should be taken using equipment capable of high resolution and should have geo-location enabled to confirm the location, date, and time that each image was taken. Image files name should include the plot number and detail reference according to the numbers used in paragraph B.7. E.g. Plot 1 eaves detail would be P1/3b.

Appendix C: Work to thermal elements

C.1 This Appendix provides guidance on cost-effectiveness of insulation measures when undertaking various types of work on a thermal element. Table C1 sets out target U-values that would be considered reasonable improvement in ordinary cases and examples of construction that may be used to achieve the proposed performance.

C.2 If it is not reasonable to meet the target U-values in **Table A1** taking into account technical risk and practicality of the work in relation to the dwelling and impacts on adjoining buildings, then the level of performance should be as close as practically possible. The final column in Table C1 provides guidance on a number of specific issues that may need to be considered to determine an appropriate course of action. In general the proposed works should take account of all of the following.

a. The requirements of any other relevant parts of Schedule 1 to the Building Regulations.
b. The general guidance on technical risk relating to insulation improvements contained in **BR 262.**
c. For buildings falling within the categories set out in paragraphs 0.7 to 0.12, Historic England's *Energy Efficiency in Historic Buildings: Application of Part L of the Building Regulations to historic and traditionally constructed buildings (2017).*

C.3 General guidance is available from relevant British Standards.

Table C1 Cost-effective U-value targets when undertaking renovation works to thermal elements

Proposed works	Target U-value W/(m^2.K)	Typical construction	Comments (reasonableness, practicability and cost- effectiveness)
Pitched roof constructions[1]			
Renewal of roof covering – No living accommodation in the roof void – existing insulation (if any) at ceiling level. No existing insulation, existing insulation less than 50 mm, in poor condition, and/or likely to be significantly disturbed or removed as part of the planned work	0.16	Provide loft insulation – 250 mm mineral fibre or cellulose fibre as quilt laid between and across ceiling joists or loose fill or equivalent	Assess condensation risk in roof space and make appropriate provision in accordance with the requirements of Part C relating to the control of condensation. Additional provision may be required to provide access to and insulation of services in the roof void
Renewal of roof covering – Existing insulation in good condition and will not be significantly disturbed by proposed works. Existing insulation thickness 50 mm or more but less than 100 mm	0.16	Top up loft insulation to at least 250 mm mineral fibre or cellulose fibre as quilt laid between and across ceiling joists or loose fill or equivalent. This may be boarded	Assess condensation risk in roof space and make appropriate provision in line with the requirements of Part C relating to the control of condensation. Additional provision may be required to provide insulation and access to services in the roof void Where the loft is already boarded out and the boarding is not to be removed as part of the work, the practicality of

		out	insulation works would need to be considered
Renewal of the ceiling to cold loft space. Existing insulation at ceiling level removed as part of the works	0.16	Provide loft insulation – 250 mm mineral fibre or cellulose fibre as quilt laid between and across ceiling joists or loose fill or equivalent. This may be boarded out	Assess condensation risk in roof space and make appropriate provision in accordance with the requirements of Part C relating to the control of condensation. Additional provision may be required to provide insulation and access to services in the roof void Where the loft is already boarded out and the boarding is not to be removed as part of the work, insulation can be installed from the underside but the target U-value may not be achievable
Renewal of roof covering – Living accommodation in roof space (room-in- the-roof type arrangement), with or without dormer windows	0.16	Cold structure – Insulation (thickness dependent on material) placed between and below rafters Warm structure – Insulation placed between and above rafters	Assess condensation risk (particularly interstitial condensation), and make appropriate provision in accordance with the requirements of Part C relating to the control of condensation (Clause 8.4 of **BS 5250** and **BS EN ISO 13788:2002** Practical considerations with respect to an increase in structural thickness (particularly in terraced dwellings) may necessitate a lower performance target
Dormer window constructions			
Renewal of cladding to side walls	0.30	Insulation (thickness dependent on material) placed between and/or fixed to outside of wall studs. Or fully external to existing structure depending on construction	Assess condensation risk and make appropriate provision in accordance with the requirements of Part C
Renewal of roof covering	-	Follow guidance on improvement to pitched or flat roofs as appropriate	Assess condensation risk and make appropriate provision in accordance with the requirements of Part C
Flat roof constructions			
Renewal of roof covering – Existing insulation, if any, less than 100 mm, mineral fibre (or equivalent resistance) or in poor condition and likely to be significantly disturbed or removed as part of the planned work	0.16	Insulation placed between and over joists as required to achieve the target U-value – Warm structure	Assess condensation risk and make appropriate provision in accordance with the requirements of Part C. Also see **BS 6229:2003** for design guidance
Renewal of the ceiling to flat roof area. Existing insulation removed as part of the works	0.16	Insulation placed between and to underside of joists to achieve target U-value	Assess condensation risk and make appropriate provision in accordance with the requirements of Part C. Also see **BS 6229:2003** for design guidance. Where ceiling height would be adversely affected, a lower performance target may be appropriate
Solid wall constructions			

Renewal of internal finish to external wall or applying a finish for the first time	0.30	Dry-lining to inner face of wall – insulation between studs fixed to wall to achieve target U-value – thickness dependent on insulation and stud material used Insulated wall board fixed to internal wall surface to achieve the required U-value – thickness dependent on material used	Assess the impact on internal floor area. In general it would be reasonable to accept a reduction of no more than 5% in the area of a room. However, the use of the room and the space requirements for movement and arrangements of fixtures, fittings and furniture should be assessed. In situations where acoustic attenuation issues are particularly important (e.g. where insulation is returned at party walls) a less demanding U-value may be more appropriate. In such cases, the U-value target may have to be increased to 0.35 or above depending on the circumstances. Assess condensation and other moisture risks and make appropriate provision in accordance with the requirements of Part C. This will usually require the provision of a vapour control and damp protection to components. Guidance on the risks involved is provided in The Building Research Establishment's *BR 262* and, on the technical options, in Energy Saving Trust publications.
Renewal of finish or cladding to external wall area or elevation (render or other cladding) or applying a finish or cladding for the first time	0.30	External insulation system with rendered finish or cladding to give required U-value	Assess technical risk and impact of increased wall thickness on adjoining buildings
Ground floor constructions			
Renovation of a solid or suspended floor involving the replacement of screed or a timber floor deck	See comment	Solid floor – replace screed with an insulated floor deck to maintain existing floor level Suspended timber floor – fit insulation between floor joists prior to replacement of floor deck	The cost-effectiveness of floor insulation is complicated by the impact of the size and shape of the floor (perimeter/area ratio). In many cases existing un-insulated floor U-values are already relatively low when compared with wall and roof U-values. Where the existing floor U-value is greater than 0.70 W/(m^2.K), then the addition of insulation is likely to be cost-effective. Analysis shows that the cost–benefit curve for the thickness of added insulation is very flat, and so a target U-value of 0.25 W/(m^2.K) is appropriate subject to other technical constraints (adjoining floor levels, etc.)

Appendix D: Standards referred to

BS 1566-1 Copper indirect cylinders for domestic purposes. Open vented copper cylinders. Requirements and test methods (2002+A1:2011)

BS 3198 Specification for copper hot water storage combination units for domestic purposes (1981)

BS 5250 Code of practice for control of condensation in buildings (2002)

BS 5422 Method for specifying thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range -40°C to +700°C (2009)

BS 5864 Installation and maintenance of gas-fired ducted air heaters of rated heat input not exceeding 70 kW net (2nd and 3rd family gases). Specification (2010)

BS 6229 Flat roofs with continuously supported coverings. Code of practice (2003)

BS 7593 Code of practice for the preparation, commissioning and maintenance of domestic central heating and cooling water systems (2019)

BS 7977-1 Specification for safety and rational use of energy of domestic gas appliances. Radiant/convectors (2009+A1:2013)

BS 7977-2 Specification for safety and rational use of energy of domestic gas appliances. Combined appliances. Gas fire/back boiler (2003)

BS 8213-4. Windows and doors. Code of practice for the survey and installation of windows and external doorsets (2016)

BS EN 253 District heating pipes. Preinsulated bonded pipe systems for directly buried hot water networks. Pipe assembly of steel service pipe, polyurethane thermal insulation and outer casing of polyethylene (2009+A2:2015)

BS EN 483 Gas-fired central heating boilers. Type C boilers of nominal heat input not exceeding 70 kW (1999+A4:2007)

BS EN 449 Specification for dedicated liquefied petroleum gas appliances. Domestic flueless space heaters (including diffusive catalytic combustion heaters) (2002+A1:2007)

BS EN 509 Decorative fuel-effect gas appliances (2000)

BS EN 613 Independent gas-fired convection heaters (2001)

BS EN 778 Domestic gas-fired forced convection air heaters for space heating not exceeding a net heat input of 70 kW, without a fan to assist transportation of combustion air and/or combustion products (2009)

BS EN 1264-4 Water based surface embedded heating and cooling systems. Installation (2009)

BS EN 1266 Independent gas-fired convection heaters incorporating a fan to assist transportation of

combustion air and/or flue gases (2002)

BS EN 1319 Domestic gas-fired forced convection air heaters for space heating, with fan-assisted burners not exceeding a net heat input of 70 kW (2009)

BS EN 12897 Water supply. Specification for indirectly heated unvented (closed) storage water heaters (2016)

BS EN 12831-3 Energy performance of buildings. Method for calculation of the design heat load. Domestic hot water systems heat load and characterisation of needs (2017)

BS EN 12975-1 Thermal solar systems and components. Solar collectors. General requirements (2006+A1:2010)

BS EN 13278 Open fronted gas-fired independent space heaters (2013)

BS EN 14511 Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling (2013)

BS EN 14351-1 Windows and doors. Product standard, performance characteristics. Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics (2006 (+AMD 21:20160))

BS EN 14825 Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling. Testing and rating at part load conditions and calculation of seasonal performance (2016)

BS EN 14829 Independent gas-fired flueless space heaters for nominal heat input not exceeding 6 kW (2007)

BS EN ISO 13788:2002 Hygrothermal performance of building components and building elements. Internal surface temperature to avoid critical surface humidity and interstitial condensation. Calculation methods (13788:2002)

Appendix E: Documents referred to

Legislation

Ancient Monuments and Archaeological Areas Act 1979

Energy Information (Household Air Conditioners) (No 2) Regulations, SI 2005/1726

Planning (Listed Buildings and Conservation Areas) Act 1990

The Building Regulations 2010, SI 2010/2214

The Building (Approved Inspectors etc.) Regulations 2010, SI 2010/2215

Ecodesign for Energy-Related Products Regulations 2010

The EU Ecodesign Regulation No 206/2012

Documents

Building Research Establishment

BR 262 *Thermal insulation: avoiding risks* (2002). 3rd ed.

BR 443 *Conventions for U-value calculations* (2019). Available at: https://www.brebookshop.com/details.jsp?id=328041

BR 497 *Conventions for calculating linear thermal transmittance and temperature factors (2007 and 2010 amendment and conventions).* ISBN 978 1 86081 986 5

Information Paper 1/06 *Assessing the effects of thermal bridging at junctions and around openings in the external elements of buildings* (2006). ISBN 978 1 86081 904 9

Design of low-temperature domestic heating systems: A guide for system designers and installers (FB 59) (2013).

Chartered Institution of Building Services Engineers (CIBSE)

Design Guide A: Environmental Design (2015)
Society of Light and Lighting Lighting Handbook (2018)

Chartered Institute of Plumbing and Heating Engineers (CIPHE)

Plumbing Engineering Services Design Guide (2002)

Department for Business, Energy and Industrial Strategy (BEIS)

The Government's Standard Assessment Procedure for energy rating of dwellings, SAP 10. Available at www.bregroup.com/sap/sap10/.

Energy Saving Trust

CE54 Domestic Heating Sizing Method (2011)

Glass and Glazing Federation (GGF)

Guide to the Calculation of Energy Ratings for Windows, Roof Windows and Doors (2013)

HETAS

The Official Guide to HETAS Approved Products and Services (2017)

Historic England

Energy Efficiency in Historic Buildings: Application of Part L of the Building Regulations to historic and traditionally constructed buildings (2017)

Hot Water Association

Performance Specification for Thermal Stores (2010) Available at: http://heatweb.com/literature/HWA%20Thermal%20Store%20Specification.pdf [accessed 17.12.20]

Local Authority Building Control

Construction Details. Available at: https://www.labc.co.uk/business/construction-details

Microgeneration Certification Scheme

Microgeneration Installation Standard: MIS 3005, issue 5.0 (2017)

Ministry of Housing, Communities and Local Government

Approved Document L, Volume 2: Buildings other than Dwellings [available at implementation stage]

Approved Document F: Volume 1: Dwellings [available at implementation stage]

Guide to the Condensing Boiler Installation Assessment Procedure for Dwellings.

Manual to the Building Regulations: A Code of Practice for Use in England (2020). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/901517/Manual_to_building_regs_-_July_2020.pdf

National Association of Rooflight Manufacturers (NARM)

Technical Document NTD 2 *Assessment of thermal performance of out-of-plane rooflights* (2010)

OFTEC

OFS A102 Applied Standard A102 Room heaters with atomising or vapourising burners with or without boilers, heat output up to 25kW (2004)

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*[**Note for consultation:** The index will be provided at implementation stage]*