

The logo for the Concrete Block Association (CBA) features the letters 'C', 'B', and 'A' in white, each enclosed within a small orange square. These three squares are arranged horizontally and are separated by thin white vertical lines. The entire logo is set against a dark blue background that is part of a larger architectural wireframe pattern.

C B A

CONCRETE BLOCK
ASSOCIATION

February 2006

Aggregate Concrete Blocks

PART L

Thermal Insulation from April 2006

Guidance for Designers and Users

Introduction

New measures to improve the energy efficiency of buildings have been announced by the Government.

- The aim is to meet the requirements of The Energy Performance of Buildings Directive (EPBD) which aims to further combat climate change and requires buildings to be better insulated and make use of more efficient heating systems.
- The changes to Part L (conservation of fuel and power) of the Building Regulations for England and Wales are applicable from **6th April 2006**.
- The revised Part L will also make air leakage pressure testing of buildings mandatory, thereby improving compliance with the regulations.
- The use of Robust Details for airtightness of dwellings may provide an alternative to routine testing, although at present the required details have not yet been developed.

This document gives guidance on compliance to satisfy the requirements of Building Regulation L1 (England and Wales) 2006.

Aggregate concrete block solutions

Although the performance values of the building envelope will depend on factors such as air permeability values, fuel type and heating efficiency it is likely that wall U-values of around 0.30 W/m²K will be required. The following aggregate block solutions meet this level of performance and are applicable to any type of building.

Approved documents

The new Part L Approved Documents are in 4 sections as follows:

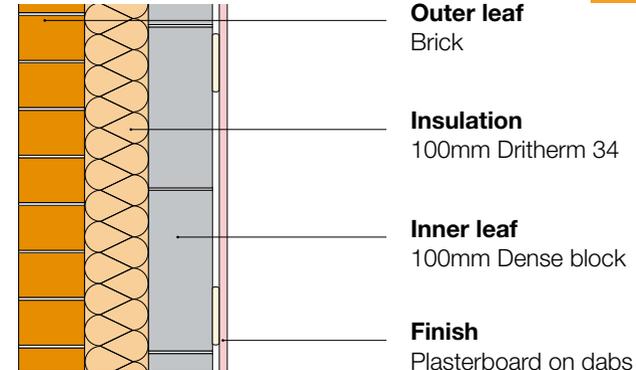
Part L1	→	Approved Document L1A New dwellings
Housing	→	Approved Document L1B Existing dwellings
Part L2	→	Approved Document L2A New buildings other than dwellings
Non Dwellings	→	Approved Document L2B Existing buildings other than dwellings

A number of other publications are listed in the Approved Documents and are relevant to assess compliance.

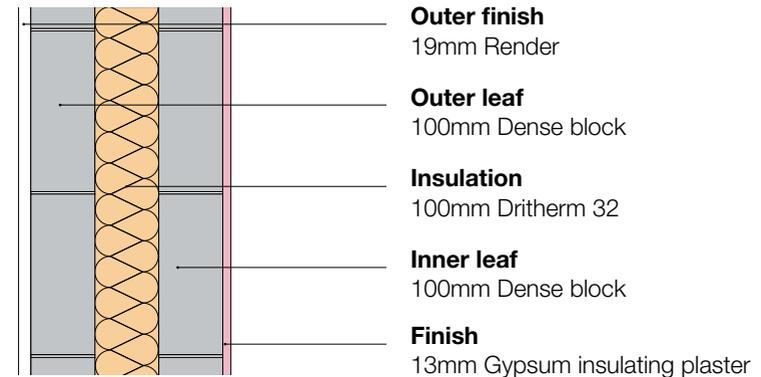
The guidance in Approved Document L1A is limited to new dwellings with a total floor area not greater than 450m². For dwellings exceeding this size, compliance can be assessed using a calculation procedure known as the Simplified Building Energy Model. Conservatories with a floor area greater than 30m² have to comply with AD L1.

Full Fill Solutions

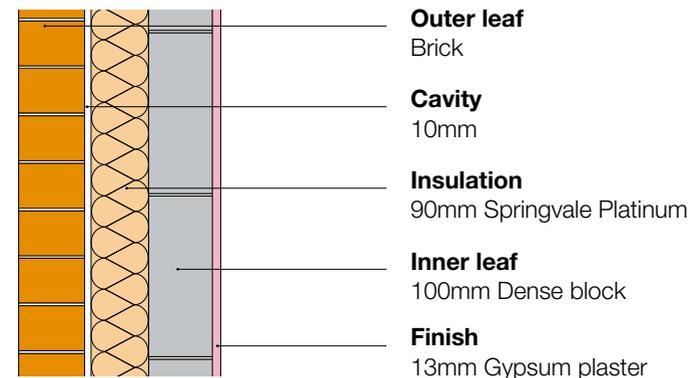
Solution 1 - U value = 0.30



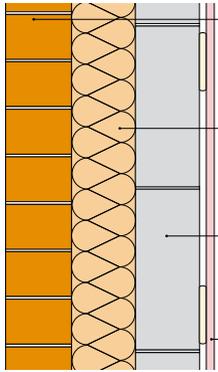
Solution 2 - U value = 0.29



Solution 3 - U value = 0.29

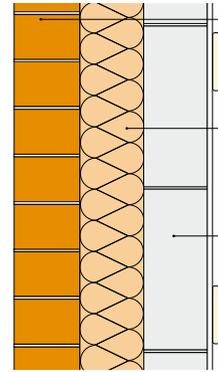


Solution 4 - U value = 0.27



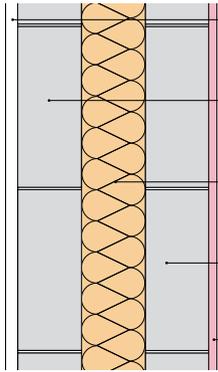
- Outer leaf**
Brick
- Insulation**
100mm Dritherm 32
- Inner leaf**
100mm Medium density block
- Finish**
Plasterboard on dabs

Solution 7 - U value = 0.28



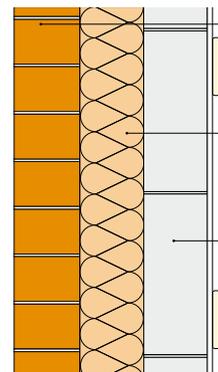
- Outer leaf**
Brick
- Insulation**
100mm Rockwool
- Inner leaf**
100mm Low density block
- Finish**
8mm Parge & Plasterboard on dabs

Solution 5 - U value = 0.27



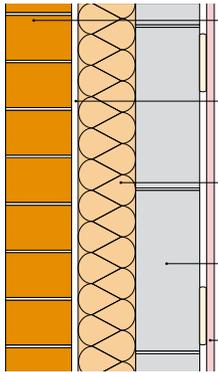
- Outer finish**
19mm Render
- Outer leaf**
100mm Medium density block
- Insulation**
100mm Dritherm 32
- Inner leaf**
100mm Medium density block
- Finish**
13mm Gypsum insulating plaster

Solution 8 - U value = 0.26



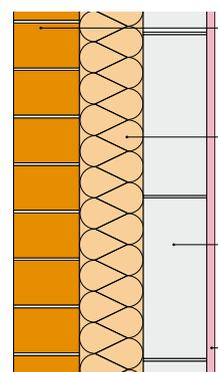
- Outer leaf**
Brick
- Insulation**
100mm Dritherm 32
- Inner leaf**
100mm Low density block
- Finish**
8mm Parge & Plasterboard on dabs

Solution 6 - U value = 0.27



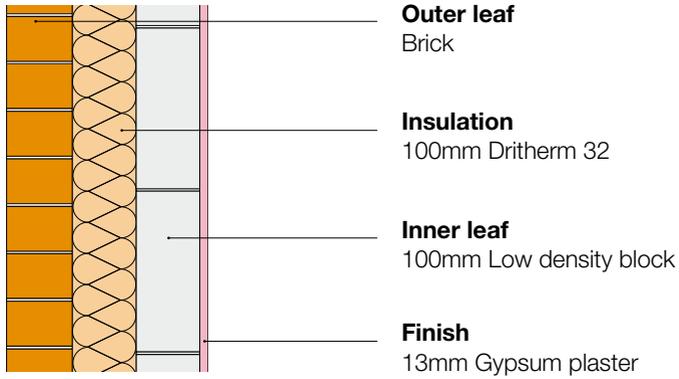
- Outer leaf**
Brick
- Cavity**
10mm
- Insulation**
90mm Springvale Platinum
- Inner leaf**
100mm Medium density block
- Finish**
Plasterboard on dabs

Solution 9 - U value = 0.30



- Outer leaf**
Brick
- Insulation**
100mm Rockwool
- Inner leaf**
100mm Low density block
- Finish**
13mm Gypsum plaster

Solution 10 - U value = 0.27



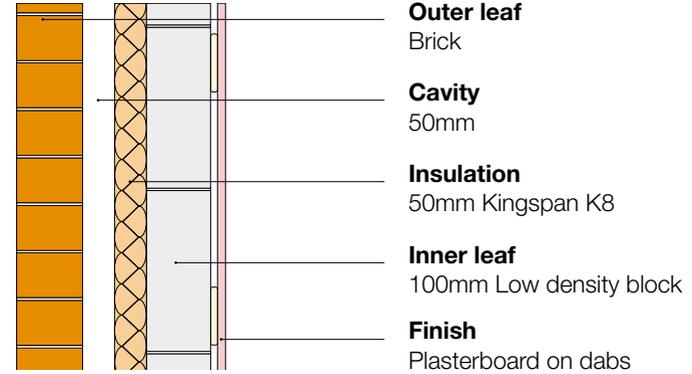
Outer leaf
Brick

Insulation
100mm Dritherm 32

Inner leaf
100mm Low density block

Finish
13mm Gypsum plaster

Solution 13 - U value = 0.27



Outer leaf
Brick

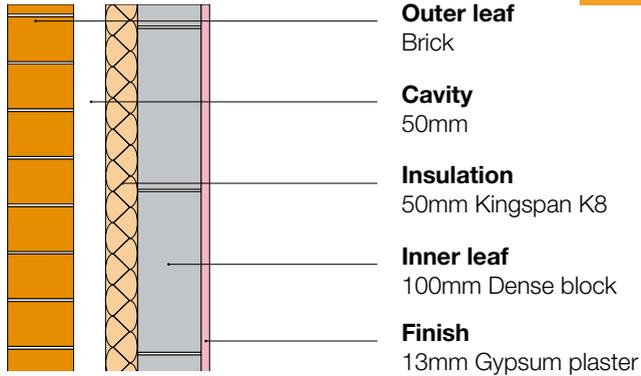
Cavity
50mm

Insulation
50mm Kingspan K8

Inner leaf
100mm Low density block

Finish
Plasterboard on dabs

Solution 11 - U value = 0.30



Outer leaf
Brick

Cavity
50mm

Insulation
50mm Kingspan K8

Inner leaf
100mm Dense block

Finish
13mm Gypsum plaster

Partial Fill Solutions

Solution 12 - U value = 0.28



Outer leaf
Brick

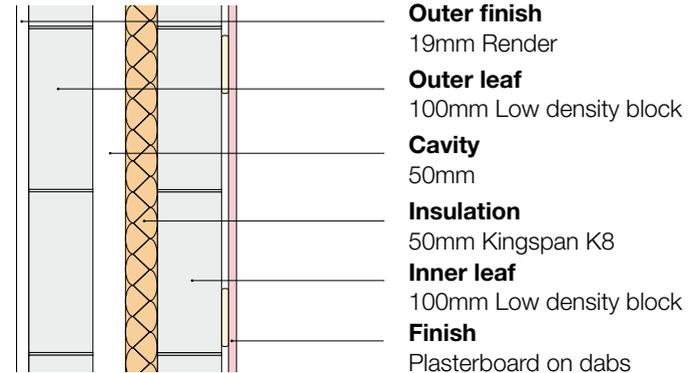
Cavity
50mm

Insulation
50mm Kingspan K8

Inner leaf
100mm Medium density block

Finish
Plasterboard on dabs

Solution 14 - U value = 0.25



Outer finish
19mm Render

Outer leaf
100mm Low density block

Cavity
50mm

Insulation
50mm Kingspan K8

Inner leaf
100mm Low density block

Finish
Plasterboard on dabs

Part L requirements - dwellings

The 2006 amendments to Part L1 seek to achieve about a 20% reduction in carbon emissions when compared to dwellings built to the 2002 standards of thermal insulation. Compliance can only be demonstrated using a revised Government's Standard Assessment Procedure (SAP 2005) calculation procedure.

SAP 2005 & Emission rates

The use of SAP 2005 will result in the reporting of CO₂ emissions from:

- 1 Space and water heating, (CH) and
- 2 The use of internal fixed lighting (CL).

The Target Emission Rate (TER) will need to be determined. This is calculated using approved software based on SAP 2005 and is, in turn, based upon a notional building which assumes a 20% improvement on the 2002 regulation design values. The following formula is used to determine the TER.

$$\text{TER} = (\text{CH} \times \text{fuel factor} + \text{CL}) \times (1 - \text{improvement factor})$$

The fuel factor is a tabulated value from the Approved Document and is dependant on the fuel type.

The dwelling emission rate (DER) is calculated based on the energy features of the proposed dwelling. It needs to be carried out twice.

First	based on the 'as designed' construction for submission to Building Control.
Second	on completion taking into account the actual construction and services, as well as the actual air permeability found from site tests. Neither value should be worse than the TER for the dwelling to comply.

Compliance criteria

Once the TER has been calculated compliance is met by following five criteria.

Stage 1

Check (by calculation) that the predicted rate of carbon dioxide emissions from the dwelling (DER) is not greater than the Target Emissions Rate (TER).

Stage 2

The dwelling fabric and the fixed services should have performance values no worse than the specified design limits. See 'Limits on Design Flexibility'.

Stage 3

The dwelling should include appropriate passive control measures to limit the effect of solar gains on indoor temperatures.

Stage 4

The performance of the dwelling, as built, is consistent with the DER. This requires a check to ensure that any changes in performance and specification of materials between design and construction do not affect the TER. A final calculation of the DER is required to confirm compliance.

Stage 5

Information concerning the energy efficient operation of the dwelling should be provided to the occupier. This will include set/s of operating and maintenance instructions produced in such a way that householders can understand. This information is expected to be included as part of the 'Home Information Pack'.

Limits on design flexibility

For design purposes the limiting U-values shown should not be exceeded. In practice the envelope standards would need to be better than the limiting values. Typically for walls design U-values would be expected to be around 0.30 W/m²K.

Element	(a) Area-weighted dwelling average	(b) Worst individual sub-element
Wall	0.35	0.70
Floor	0.25	0.70
Roof	0.25	0.35
Windows, roof windows, roof lights & doors	2.2	3.3

A reasonable limit for the design air permeability is 10m³/(h.m²)@ 50 Pa. Significantly better standards of air permeability may need to be accompanied with mechanical ventilation.

Limiting the effects of solar gains in summer

Designers need to check that the dwelling is not prone to summertime overheating. High mass structures perform well in this area by being able to store heat during the daytime and releasing heat as the dwelling cools down overnight. Maximum advantage will result from the use of aggregate blocks in external and internal walls as well as ground and intermediate beam and block flooring. Lighter forms of construction do not possess the potential for high thermal mass.

Other steps could include an appropriate combination of window size and orientation, solar protection through shading, ventilation etc. Reference should be made to 'CE 129 Reducing overheating - a designer's guide', for more information.

Quality of construction

The most important points to note are that insulation should be continuous over the whole dwelling envelope and that the air permeability is within reasonable limits. To ensure that the performance of the dwelling as built is consistent with the DER, a check is required to ensure that any changes in performance and specification of materials between design and construction do not affect the TER. A final calculation of the DER is required to confirm compliance. If it is found that the dwelling does not comply then appropriate remedies will be required to be taken. A checklist is provided in Approved Document L1A to aid identification of any nonconformity.

Continuity of insulation

For the building fabric, insulation must be continuous over the whole building envelope. This is primarily a workmanship issue and supervision should be in place to ensure there are no gaps in the insulation and that appropriate building details are followed to avoid unreasonable thermal bridging at the edges of openings and other junctions. Insulation should be applied in accordance with Accredited Construction Details or other approved details such as those in BRE SD4 or approved calculations should be carried out.

The builder is required to demonstrate that site inspection procedures are in place. For those using the Accredited Details approach, a way of achieving this would be to produce a report demonstrating that the construction checklists have been completed and show satisfactory results.

Air permeability

Appropriate air permeability tests should be undertaken to demonstrate that the design air permeability has been achieved. Details are provided in the Approved Document of the test method and criteria for selecting a testing organization. For dwellings designed using Accredited Construction Details a less onerous testing regime is required. Criteria are also given in the event of failing an air pressure test.

On small scale developments - no more than 2 dwellings - relaxation of air pressure testing is given if a dwelling of the same type and constructed by the same builder has been pressure tested and achieved the design air permeability.

Avoiding air tests altogether can be achieved by assuming a value of 15m³/(h.m²) when calculating the DER. However, using this approach is likely to result in unrealistic performance values of building elements being required elsewhere in the dwelling.

The U-values given in this brochure are correct at the time of going to press and are based on manufacturers' details available at that time. Air gap correction level 1 has been used in the U value calculations. Details of insulation products featured in the construction solutions can be obtained as follows:

Dritherm 32 and 34	Knauf Insulation	Tel. 01744 766 666	www.knaufinsulation.co.uk
Kingspan	Kingspan Insulation	Tel. 0870 733 8333	www.insulation.kingspan.com
Rockwool	Rockwool Limited	Tel. 01656 862 621	www.rockwool.co.uk
Springvale Platinum	The Springvale Group	Tel. 01457 863 211	www.springvale.com

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