

Uniclass L3221:A4	EPIC F611:X221
CI/SfB	
	Ff2 (Ajv)

Aggregate Concrete Blocks External Walls – Thermal Performance

Introduction

This data sheet gives guidance for the specification of blocks in conjunction with insulation materials for external walls, which are required to resist the passage of heat.

To ensure compliance with respect to regulatory requirements for thermal performance, specifiers may adopt any of the procedures described in the Building Regulations Part L (England & Wales) 2006 and Technical Standards Section 6 2007 (Scotland).

For England & Wales guidance on detailing to avoid thermal bridging may be found as Accredited Construction Details through www.planningportal.gov.uk and for Scotland as Accredited Construction Details through the Scottish Building Standards Agency website www.sbsa.gov.uk.

High levels of thermal insulation can be achieved in a number of different ways using aggregate concrete blocks.

Insulation Options

There are several basic options, which may be considered separately or in conjunction to enhance thermal performance.

Cavity insulation

- full fill cavity batts or full fill cavity injected systems.
- partial fill cavity wall boards.

External insulation

- external insulation protected by render or other applied finish.

Internal insulation

- insulated dry lining.

Manufacturers should be consulted for design options using their products.

Calculating U-Values

Generally all U-values should be calculated using BS EN ISO 6946 'Building components and building elements – Thermal resistance and thermal transmittance – calculation methods', so as to take account of any thermal bridging effect of mortar joints and where necessary, wall ties. However, the bridging effect of mortar joints needs only be considered when the difference in thermal resistance between block and mortar is greater than $0.1\text{m}^2\text{KW}$, and for many aggregate blocks the use of the full BS EN ISO 6946 method would not be necessary.

BS EN ISO 6946 can also be used to calculate the thermal resistance R of voided aggregate blocks by omitting the surface resistance values. Values of R for blocks for direct use in U-value calculations are normally published by CBA members.

Guidance on calculating U values to BS EN ISO 6946 can be found in BR 443 'Conventions for U-value calculations' published by BRE. Software has been developed by BRE for calculating U-values to the new regulations. The BRE software can be purchased at <http://projects.bre.co.uk/values>. A simplified version of this software for calculating the U-values of walls is available for use on www.cba-blocks.org.uk

Note: To meet Building Regulation Structural requirements the inner leaf blockwork should be at least 90mm thick.

Typical Design Solutions

Outer Leaf	Inner Leaf	Insulation	U-Value	
			LW Plaster Finish	Plaster-board Finish
FULL FILL INSULATION				
Brick	100mm dense block	90mm expanded polystyrene (Springvale Platinum with 10mm cavity)	0.30	0.28
100mm dense block rendered	100mm dense block	90mm expanded polystyrene (Springvale Platinum with 10mm cavity)	0.30	0.29
Brick or 100mm dense block rendered	100mm dense block	100mm mineral wool (Dritherm cavity slab $\lambda = 0.032$ W/mK)	0.28	0.27
Brick	100mm lightweight aggregate block (1400 density)	100mm mineral wool (Dritherm cavity slab $\lambda = 0.032$ W/mK)	0.27	0.26
Brick	100mm lightweight aggregate block (1400 density)	90mm expanded polystyrene (Springvale Platinum with 10mm cavity)	0.27	0.26
100mm lightweight aggregate block (1400 density) rendered	100mm lightweight aggregate block (1400 density)	90mm expanded polystyrene (Springvale Platinum with 10mm cavity)	0.28	0.27
100mm lightweight aggregate block (1400 density) rendered	100mm lightweight aggregate block (1400 density)	100mm mineral wool (Dritherm cavity slab $\lambda = 0.032$ W/mK)	0.26	0.25
Brick	100mm lightweight aggregate block (850 density)	100mm mineral wool (Dritherm cavity slab $\lambda = 0.032$ W/mK)	0.26	0.25
Brick	100mm lightweight aggregate block (850 density)	90mm expanded polystyrene (Springvale Platinum with 10mm cavity)	0.28	0.27
100mm lightweight aggregate block (850 density) rendered	100mm lightweight aggregate block (850 density)	100mm mineral wool (Dritherm cavity slab $\lambda = 0.032$ W/mK)	0.25	0.24
100mm lightweight aggregate block (850 density) rendered	100mm lightweight aggregate block (850 density)	90mm expanded polystyrene (Springvale Platinum with 10mm cavity)	0.27	0.26

Outer Leaf	Inner Leaf	Insulation Foil faced board r = 0.64	U-Value	
			LW Plaster Finish	Plaster- board Finish
PARTIAL FILL INSULATION (50mm retained cavity)				
Brick or 100mm dense block rendered	100mm dense block	65mm PU	0.27	0.26
100mm Architectural facing masonry	100mm lightweight aggregate block (1400 density)	65mm PU	0.27	0.26
100mm Architectural facing masonry	100mm lightweight aggregate block (1400 density)	80mm PU	0.23	0.23
Brick	100mm lightweight aggregate block (1400 density)	50mm PU	0.29	0.28
Brick	100mm lightweight aggregate block (1400 density)	65mm PU	0.26	0.26
100mm dense block rendered	100mm lightweight aggregate block (1400 density)	50mm PU	0.30	0.28
100mm dense block rendered	100mm lightweight aggregate block (1400 density)	65mm PU	0.27	0.26
Brick or 100mm dense block rendered	100mm lightweight aggregate block (1400 density)	80mm PU	0.23	0.23
Brick or 100mm dense block rendered	100mm lightweight aggregate block rendered (850 density)	50mm PU	0.29	0.28
Brick or 100mm dense block rendered	100mm lightweight aggregate block rendered (850 density)	65mm PU	0.26	0.25
100mm lightweight aggregate block (1400 density) rendered	100mm lightweight aggregate block (1400 density)	50mm PU	0.29	0.27

External Walls – Thermal Performance

Outer Leaf	Inner Leaf	Insulation Foil faced board r = 0.64	U-Value	
			LW Plaster Finish	Plaster- board Finish
PARTIAL FILL INSULATION (50mm retained cavity)				
100mm lightweight aggregate block (1400 density) rendered	100mm lightweight aggregate block (1400 density)	65mm PU	0.26	0.25
100mm lightweight aggregate block (1400 density) rendered	100mm lightweight aggregate block (1400 density)	80mm PU	0.23	0.22
100mm lightweight aggregate block (850 density) rendered	100mm lightweight aggregate block (850 density)	50mm PU	0.27	0.26
100mm lightweight aggregate block (850 density) rendered	100mm lightweight aggregate block (850 density)	65mm PU	0.25	0.24
100mm lightweight aggregate block (850 density) rendered	100mm lightweight aggregate block (850 density)	80mm PU	0.22	0.21

To receive other data sheets in this series, a list of CBA members or for further information please visit our website at www.cba-blocks.org.uk
CBA Technical Helpline 0116 222 1507

© The Concrete Block Association 2007

Although The Concrete Block Association does its best to ensure that any advice, recommendation or information it may give is accurate, no liability or responsibility of any kind (including liability for negligence) is accepted in this respect by the Association, its servants or agents.

This datasheet is manufactured from ECF (Elemental Chlorine Free) pulp sourced from certified or well managed forests and plantations. It is totally recyclable, biodegradable and acid-free.

