

Super-Insulated Masonry (S.I.M) Walls Using Airtec Blocks



Thomas Armstrong (Concrete Blocks) Ltd have introduced a simple, cost-effective masonry wall solution for achieving Code Levels 3 & 4 in the Code for Sustainable Homes. This is a proven method, widely used in Europe, which maximises the inherent thermal

mass of concrete and greatly reduces energy consumption of a building over its lifetime. All this in a simple construction using a single leaf of aerated block, a single layer of insulation and an external finish of render or clay / synthetic brick slips.

Design & Cost Savings

- Simple single leaf solid wall construction suitable for Code 3 and Code 4 homes with a u-value of 0.14.
- Thinner walls. Reduced overall wall width and reduced width of foundation trenches and walls.
- Straight walls with no dog-legs, more aesthetically pleasing design.
- A wide choice of internal and external finishes; brick, rendered finish or a mixture of the two.
- No solar panels needed to reach Code 4 due to the superior u-values possible. Some Photo Voltaic power may be required to meet the criteria for Code 4.
Thus: MUCH LOWER ANNUAL MAINTENANCE!

- Solid Airtec Block, 190mm
- Neopor Insulation, 150mm
- Brick Slip or Rendered Finish

U Value
0.14 W/m²K



Construction

S.I.M Wall

- Start and stop building as required. Buy materials as you need them. Build multiple properties at the same time.
- Thin-Joint construction allows faster, more accurate build. Once first two courses are accurately laid the rest is simply gluing blocks together. Any slight inaccuracies can be quickly corrected.
- Quick weatherproofing. The speed of thin joint construction means that the construction envelope can be finished and work can start on inside as exterior is being finished off.

Alternative Framed Wall

- Components are made to order involving long waiting times and significant financial outlay long before construction begins.
- Skilled workforce required to ensure accuracy of construction, no margin for error. Expert planning of material delivery sequences and availability of cranes etc essential.
- No option but to build the external frame in a specific sequence which requires significant weatherproofing as construction progresses.

Long-Term Performance, Flexibility and Durability

S.I.M Wall

- Zero interstitial condensation risk. Single solid block leaf with insulation adhered to it means no risk of damp and mould growth within the wall whatsoever.
- Simple construction means faster drying out after flood. The external and internal finishes are totally waterproof and the Airtec block core will only soak up water into the outer one or two cm of the block.

Alternative Framed Wall

- Multiple layers of various construction materials significantly increase risk of condensation between the layers. Special techniques and materials are required to reduce this risk.
- Following a flood it is critical to completely dry out the wall and frames to avoid long-term rot and smells.

Long-Term Performance, Flexibility and Durability (Continued ...)

- Fix directly to masonry wall wherever you want. No frame within the wall, so no guessing where the fix to. No insulation layer to disturb as it is on the outside. Holes can be filled and painted over easily.
- Strong, robust, durable masonry core. Holes and damage can be simply filled in and painted. No damage to internal insulation is possible.
- Modifications to the building are straightforward. For example, a new door or an extension can be added as holes can be cut through the masonry core. The external insulation then simply continued on the outside of the block wall.
- Kitchens require additional internal wooden cladding to allow units etc to be fixed to the wall. This greatly increases material costs and reduces householder options for future modifications.
- Holes made into the wall can breach various layers that can compromise damp-proofing of the frame, insulation and air-tightness.
- A framed wall is not easy to extend onto or cut an opening through. The position and function of each part of the frame must be known and assessed. The continuity of the cavity insulation will be difficult and costly to put right once breached.

Energy Saving

S.I.M Wall

- **NO COLD BRIDGING.** Because the insulation covers the entire external wall there is very little chance of cold bridging thus maximising energy efficiency and simplifying overall design and construction.
- Significant improvements in air-tightness are achievable, right down to $1\text{m}^3/\text{hr}/\text{m}^2$.
- Masonry construction is totally rigid and does not shrink or expand through the seasons thus maintaining its original air-tightness.
- High thermal mass is maximised. Thermal mass of a building acts as a natural heat store which evens out the seasonal highs and lows of temperatures greatly reducing the need for additional temperature regulation. Studies have shown that over the average 60-year life of a building, energy costs and carbon emissions are greatly reduced by comparison to lightweight framed constructions.

Alternative Framed Wall

- Careful design is required to minimise cold bridging. However with the insulation on the inside of the frame the amount of cold bridges that can be reduced is limited.
- It is currently unclear as to how framed construction can achieve an air-tightness of $0.6\text{m}^3/\text{hr}/\text{m}^2$ to reach Code 4 requirements.
- Initial good air-tightness is possible, but as the building shrinks and expands over the years this air-tightness is compromised.
- Framed constructions have no significant thermal mass to speak of and are prone to the seasonal temperature fluctuations which will require increased reliance on additional mechanical heating and cooling techniques to overcome.

Further Advantages of S.I.M. Walls

- Much lower snagging costs due to reduced drying shrinkage
- Fire proof wall with no cavity thus greatly reducing risk of fire spread.
- Vermin and termite proof.
- Airtec blocks are inert, non-toxic and completely recyclable.
- Heavy masonry wall provides excellent acoustic insulation.
- Solid masonry walls with external insulation are rated A+ in the BRE Green Guide.
- Airtec blocks are ISO 14001:2004, ISO 9001:2008 approved and are manufactured to Category I attestation of conformity as per Eurocode 6 and BS 5628 design codes.
- NHBC approved construction