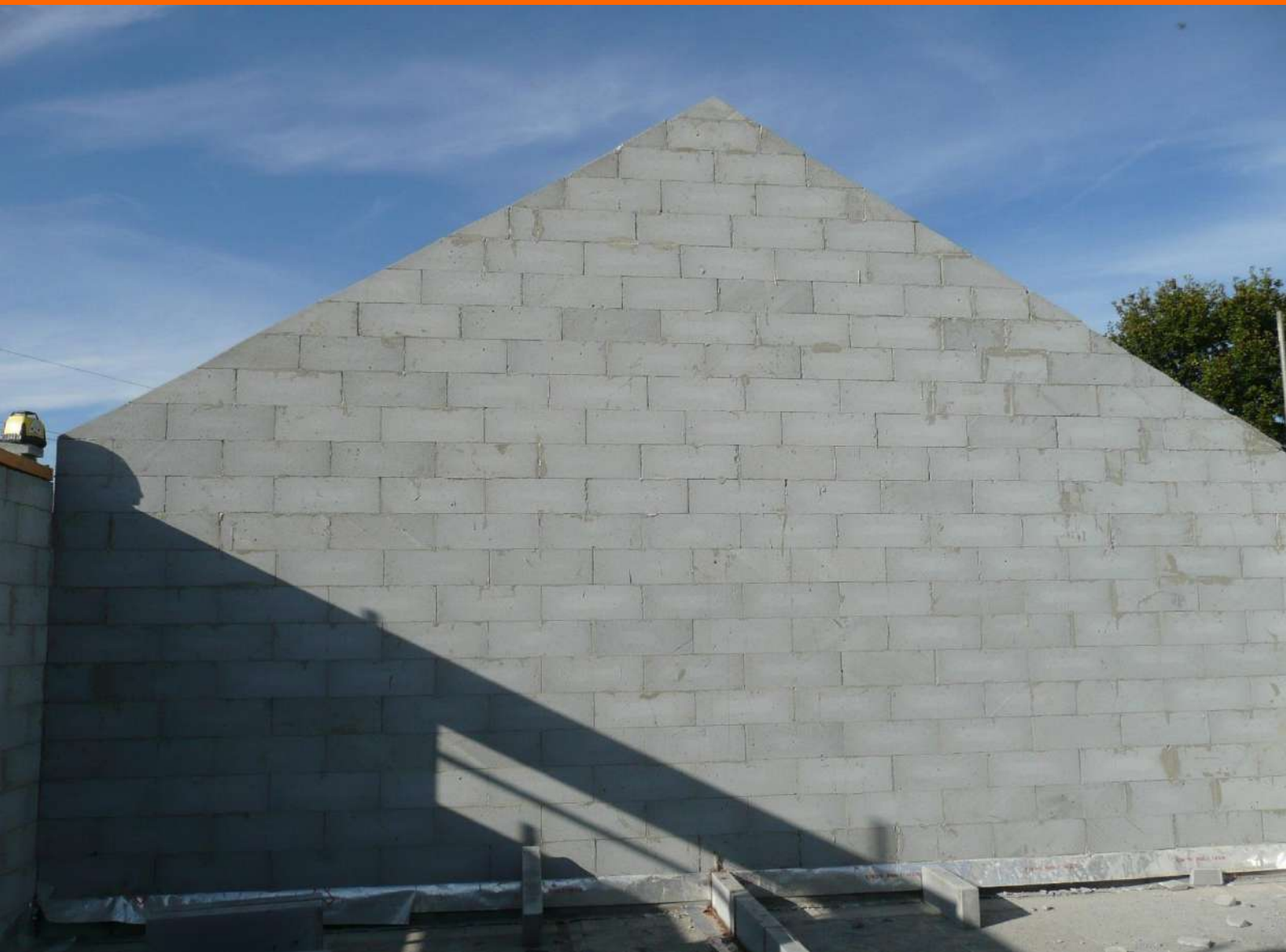




# Thin Joint Mortar Construction

Using Airtec aerated blocks from Thomas Armstrong (Concrete Blocks) Ltd

## A Detailed Guide



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*Front cover photo: Thin joint gable end wall of Airtec 190mm thick blocks clearly demonstrating the superb stability achieved with thin joint in a very short space of time.*



# What is thin joint construction?

This method of construction is very well established throughout Europe and with the ever increasing tightening of Building Regulations and Codes of Practice, thin joint mortar construction will assume greater significance in the UK due to the numerous benefits offered by this method.

Thin joint construction utilizes 2-3mm thick mortar joints using a quick-setting adhesive mortar enabling faster and easier construction. This leads to:

- Faster weatherproofing of a building and enables follow on work within the building to proceed sooner than would be the case with alternative construction methods.
- Mortar mixing consists of nothing more than adding water to the pre-mixed mortar powder – no cement mixers required, just an electric stirrer.
- Applying mortar is made simple, quick and foolproof with the use of special 'scoops' which apply the correct thickness of mortar each time thus minimizing waste and maintaining consistency and quality throughout the build.
- Excellent thermal and acoustic insulation along with superb airtightness.

## Applications

### External Cavity Walls

An inner leaf wall in thin joint achieves higher compressive strength and has an improved u-value than an equivalent wall built in conventional mortar.

The inner leaf can be built rapidly weatherproofing the building and allowing internal work to commence.



### Acoustic Separating / Party Walls

Thin joint construction can be used for separating walls compliant with Part E of the Building regs or using Robust Detail designs.

Two leaves of Airtec 'Party Wall' blocks or Airtec 'Seven' blocks can be used to offer simple, effective solutions.



### External Solid Walls

A very simple and effective build technique with external insulation which can achieve u-values as low as 0.14 W/m<sup>2</sup>K with zero thermal bridging – all with only 2 layers and no cavities!

No wall ties required, no condensation risk, totally waterproof construction.




### Internal Partition & Flanking Walls

A very quick and effective technique for building strong, durable internal walls including flanking walls to party walls.

This quick and clean build method coupled with low-weight, workable Airtec blocks offer a perfect solution to refurbishments and modifications.





# The benefits of thin joint

Thin joint construction offers all of the benefits of a modern building system with all of the familiarity and peace of mind that a brick and block masonry construction brings. There are however distinct advantages over conventional masonry construction.

- **Faster and easier laying of blocks**

With a typical mortar setting time of 20 minutes, once a course of blocks is laid the next course can be started thus enabling continual laying. Also unlike normal 10mm mortar joints, there is little chance of the blocks 'floating' on the mortar and the course settling down out of true.

- **Faster weatherproofing**

Because of the quick and strong setting of the mortar, continual laying is possible and weatherproofing can occur up to 3 times faster than with conventional methods allowing follow on work to commence inside of the building much sooner.

- **Less waste and mess**

The mortar is a bagged powder to which water is added. Therefore only mix as much as required. No cement mixers are required and no separate stocks of sand, cement, lime, admixtures and so on. Airtec blocks can be cut, shaped and so any damaged blocks can be reused.

- **Flexibility**

Only as much mortar needs to be mixed as required. Blocks can be easily ordered without lengthy lead-times and paying up front as is typical for framed building components. Semi-skilled labourers can quickly learn how to glue the blocks together. Easy to adapt and overcome overlooked design flaws during the build quickly and inexpensively.

- **Thermal mass**

A heavy masonry building acts as a heat store reducing the seasonal temperature fluctuations experienced in lighter-weight constructions. This reduces the need for secondary heating and cooling equipment which has been shown to significantly reduce the CO<sub>2</sub> emissions of a dwelling over its nominal 60 year lifetime.

- **Quality of build**

The dimensional accuracy of Airtec blocks means a more solid and tight wall construction. And because the inner leaf can be built independently of the outer leaf, there is no chance for mortar snots forming on the wall ties and in the cavity.

- **Stability and Strength**

The fast-setting and adhesive nature of thin joint mortar bonds the blocks together quickly and thoroughly allowing builds to proceed upwards quickly and safely. Furthermore, Eurocode 6 shows that thin joint mortar walls have an enhanced compressive strength over conventional mortar.

- **Enhanced thermal insulation**

Thinner mortar joints means significantly less thermal bridging through the wall. U-Value improvements of up to 10% can be achieved over conventional mortar walls made with the same block. This could reduce the thickness of expensive secondary insulation in the wall, whilst still achieving the required U-Value.

- **Increased airtightness**

As with the improvements in thermal insulation, the significant reduction in the proportion of mortar in a wall improves airtightness of the construction. Furthermore the likelihood of mortar beds and perpendes being left unfilled is greatly reduced due to the laying technique and tools which practically assure a fully-filled mortar joint at all times.

- **Acoustic insulation**

The cellular nature of aerated blocks provides a very effective barrier to airborne sound transmission. Thin joint separating walls can be built to Part E Building Regulations or Robust Details which have a proven successful track record.



# Why use Airtec blocks?

Airtec blocks are manufactured in the UK's newest production facility using completely unique, groundbreaking techniques. This has resulted in a product range with exceptional technical and physical properties, maximizing the benefits of thin joint construction.

## Exceptional dimensional accuracy

Because only 2-3mm mortar joints are utilized, the dimensional accuracy of the blocks needs to be excellent in order to get the best results. All Airtec blocks are perfectly suited to thin joint construction, as well as conventional mortar construction.

Airtec blocks meet the very tightest possible dimensional tolerance category of "Thin Layer Mortar B" (TLMB), an exceptional achievement! This means that once the first course is set out perfectly level in conventional mortar, the builder can simply commence to build in thin joint and be sure that the courses will remain level due to the unique accuracy of the blocks.

**Thin Layer Mortar B (TLMB) is defined in BS EN 771-4 as:**

<b>Length:</b>	<b>± 1.5mm</b>
<b>Height:</b>	<b>± 1.0mm</b>
<b>Width:</b>	<b>± 1.5mm</b>
<b>Flatness of bed faces:</b>	<b>≤ 1.0mm</b>
<b>Plane parallelism of bed faces:</b>	<b>≤ 1.0mm</b>

## Exceptional thermal performance

	Dry Density kg/m <sup>3</sup>	Design Thermal Conductivity W/mK	Typical thermal value for similar products, W/mK
Airtec XL, 2.9N	460	0.09	0.11
Airtec Standard, 3.6N	530	0.11	0.15
Airtec Party Wall, 3.6N	600	0.13	0.16
Airtec Seven, 7.3N	730	0.17	0.19
Airtec Ten, 10.4N	790	0.19	0.21



## An environmentally friendly product

All Airtec products are manufactured in the UK's newest production facility utilizing bespoke and entirely unique production techniques which minimize energy usage during production, reclaim excess energy throughout the process and maximize the use of recycled raw materials. Airtec blocks consist of over 90% recycled raw materials.

All Airtec products are ISO 14001:2004 Environmental Management certified (cert No. 09/E001).

**Airtec external or internal walls achieve A to A+ ratings in the BRE Green Guide to Specification ratings system**

## A quality product

The Airtec facility uses the very latest technology to produce high quality and high performance products time and time again. We use a stringent checking, testing and quality assurance system which undergoes rigorous and thorough inspection by UKAS accredited bodies.

All Airtec products are ISO 9001:2008 Quality Assured (cert no. 06/Q006).

All Airtec products are British Board of Agrément certified (BBA cert no. 06/4309).



# Performance

Thin Joint construction is a proven construction technique which satisfies the requirements of the UK Building Regulations and other building codes. In a number of cases, this method of construction exceeds the performance of traditional masonry and other methods of construction.

## Structural performance

Thin Joint mortar construction is a widely used and proven method which complies with all UK building codes and Eurocode 6 (BS EN 1996-1-1 Design of Masonry Structures). In Eurocode 6, it is shown that walls constructed using thin joint mortar result in an enhanced compressive strength over walls constructed using conventional mortar joints.

**BS EN 1996-1 Eurocode 6 shows that the compressive strength of thin joint walls is greater than that of conventional mortar walls.**

- Calculations show that the characteristic compressive strength of a wall constructed with thin joint can be up to 18% higher than that of an equivalent wall using conventional mortar.
- The characteristic flexural strengths of thin joint masonry walls are the same as those of conventional masonry walls.
- The strength of the thin joint mortar itself is greater than that of a designation (iii) conventional mortar.
- Walls can be erected faster using thin joint mortar and are more stable during construction than conventional mortar walls due to the fast and strong bonding of the mortar.
- It is always recommended to securely support and prop any walls especially against the possibility of strong winds and where walls are not supported by internal partition walls.

## Fire resistance

Excellent fire-resistance is achieved easily using thin joint Airtec walls. Airtec blocks are non-combustible and have been tested and approved to meeting "Class A1" resistance to fire rating to the latest European BS EN 13501-1 standard, the very best possible category for a building component. Airtec block walls comply with Part B of the Building Regs. British and European building codes show that walls built using thin joint mortar perform equally as well as walls built using conventional mortar.

**All Airtec blocks are Class A1 fire resistant to the latest European standards – exceeding the old 'Class 0' British Standard that it replaced.**

		Minimum AIRTEC Block Thickness Required (mm) for stated fire resistances					
Wall Type	Finish	6hrs	4hrs	3hrs	2hrs	1.5hrs	1hr
Loadbearing Single Leaf	None	215mm	190mm	140mm	100mm	100mm	100mm
Non Loadbearing Single Leaf	None	150mm	100mm	100mm	100mm	100mm	100mm

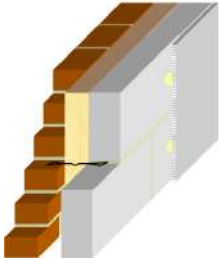
- The above figures apply to all Airtec grades, 2.9N, 3.6N, Party Wall, 7.3N & 10.4N
- These figures apply to both Conventional and Thin-Joint mortar constructions
- Visit [www.thomasarmstrong.co.uk](http://www.thomasarmstrong.co.uk) 'Information Zone' for a complete table of fire ratings

## Thermal performance

Mortar joints in walls are a thermal bridge and always lessen the thermal performance of a wall. The proportion of mortar joints in a thin joint wall is significantly reduced in comparison to conventional mortar joints. In addition, our longer 620mm Airtec blocks reduce the mortar joint proportion even further especially if using our 'Airtec Large Format' blocks which have a face size of 620mm x 430mm.

This results in better u-values and gives the builder money-saving options (for example use less insulation to meet a target u-value, offset u-values elsewhere to maintain SAP rating).

Thin joint walls can improve a u value by up to 10% compared to an equivalent conventional masonry wall

Fully Filled Cavity (Brick outer, drylined finish)	Partially Filled Cavity (Brick outer, drylined finish)	SIM Wall (see below) (Brick slip or render finish)
		
Example: Airtec XL   100mm Dritherm 32	Example: Airtec XL   50mm Kingspan TW50	Example: 190mm Airtec XL   150mm Neopor
<b>U-Value = 0.22 W/m²K</b> (If using 10mm mortar = 0.23 W/m²K)	<b>U-Value = 0.23 W/m²K</b> (If using 10mm mortar = 0.24 W/m²K )	<b>U-Value = 0.14 W/m²K</b> (If using 10mm mortar = 0.15 W/m²K )

## Super-Insulated Masonry (SIM) Walls

SIM walls are solid Airtec thin joint walls combined with external insulation. This method of building has been used throughout Europe for decades and gives the following advantages over any other form of construction:

- U Values of 0.14 W/m²K can be easily achieved using only two layers (excluding internal & external finishes).
- No cavities, several watertight barriers and zero chance of damp
- Zero cold bridging leading to even better SAP values.
- Brick-slip or reinforced render external finish; any colour, any style.
- Quick, easy and cost effective<sup>(\*)</sup> build method.
- A high thermal mass building which will reduce seasonal temperature fluctuations and save on the costs of installing and running heating & cooling systems.
- Excellent airtightness and acoustic insulation is achieved, particularly if the internal walls are plastered.
- A robust house which unlike framed constructions is easy to modify, extend to, fix items to and repair if required.



Find out more about SIM walls on our website:

[www.thomasarmstrong.co.uk](http://www.thomasarmstrong.co.uk)

(\* It has been shown that a SIM house can save up to 20% in build costs over an equivalent framed construction)

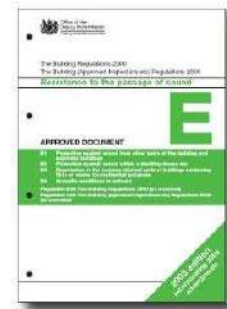
## Acoustic insulation

Despite the low density and low-weight of Airtec blocks, their non-interconnected cellular structure provides an effective barrier to the transmission of airborne sound.

Conventional or thin joint mortar construction using Airtec blocks for party walls, internal walls and associated flanking walls is perfectly suitable to satisfy the requirements of the Building Regulations.

Walls can be built in accordance with Part E of the Building Regs and approved through pre-completion testing (PCT) or to an approved Robust Standard Detail which does not require PCT to be carried out.

In common with all masonry separating and internal partition walls, the acoustic performance is dependant on good workmanship at all stages; fully filling the mortar joints, good design avoiding vertical movement joints and keeping cavities free of debris.



**Part L 2010 of the Building Regulations also requires the u value of the Party Wall to be determined.**

**Airtec blocks in thin joint mortar will provide the best u value of any equivalent masonry wall.**

## Robust Detail Party Walls

There are currently two approved Robust Standard Details for Airtec walls in thin joint mortar. However, new Robust Details are continually released and these can be found on **[www.robustdetails.com](http://www.robustdetails.com)**.

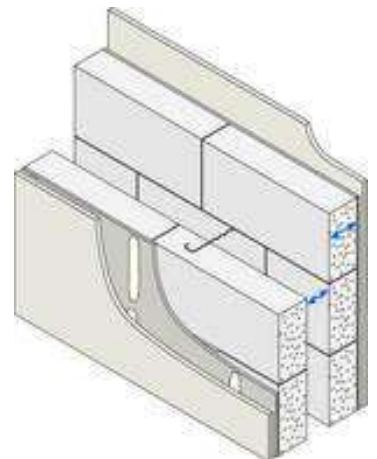
The current Robust Details for thin joint aerated block walls are:

### E-WM-10

- Two leaves of 100mm Airtec Party Wall or Seven block
- 75mm (minimum) clear cavity  
(Optional cavity insulation: Saint Gobain-Isover RD Party Wall Roll)
- Ancon Staifix HRT4 or Clan PWT4 wall ties at 2.5 ties per m<sup>2</sup>
- Cement:sand render coat, scratched, both sides  
(Optional internal render: British Gypsum Gyproc Soundcoat Plus 8mm)
- Gypsum-based board mounted on dabs, both sides

### E-WM-13

- As above but without any wall ties





## Design Details

The methods involved in building with thin joint masonry are generally the same as for traditional masonry. There are however a number of subtle differences in technique required in order to achieve the very best results.

### Setting out & correct coursing heights

It is recommended that built-in joists and joist hanger plates sit on the factory cut bed face of the Airtec block as well as floor beams and window sills. Correctly determining coursing heights at the start of the build will result in a better quality construction and minimize any unnecessary waste of time and materials.

- The locations of door and window openings are marked out in the usual manner for any masonry construction.
- The outer leaf of a cavity wall should also be built up initially along with the inner leaf to allow the accurate marking out of window and door openings and to determine the precise coursing levels of the thin joint inner leaf.
- This ensures that subsequent lintel and joist positions can be accurately determined and any adjustments can be made if necessary early on rather than having to take remedial action further on in the build.

**Thin joint courses attain great strength very quickly and there is no need to raise corners during the build. Raising corners is not recommended.**

### Below DPC and ground floor

Airtec solid foundation blocks are lightweight, easy to handle, freeze/thaw resistant and avoid the time and cost associated with using cavity foundation walls. The foundation wall is built up to dpc in conventional 1:6 cement:sand mortar.

- The first course of the blockwork should be laid on a conventional 10mm 1:6 cement:sand mortar bed.
- The perpend must be bonded using thin joint mortar.
- The course should be made perfectly level and the mortar allowed to fully cure (for at least 12 hours) before proceeding with the next course.
- If necessary the Airtec blocks can be sanded down to within 2mm level across the course using special rasps designed for this purpose. A laser level is particularly suited to check for this level of accuracy.
- The coursing height should be pre planned and adjusted so as the ground floor bearing level is met by a full block course without any split courses.

**Airtec blocks and thin joint mortar are suitable for use below dpc in class DS1 and DS2 soil and groundwater conditions as defined in BRE Special Digest 1:2005**

See BBA Certificate 06/4309

## Openings, windows and reveals

- The inner leaf thin-joint wall coursing heights will not coordinate with the outer leaf conventional mortar brick or block coursing heights. However, Airtec blocks can be easily sanded down with a purpose made rasp tool to ensure the correct lintel and sill levels for windows and other openings.
- Airtec blocks can be cut to the required thickness to form a reveal. These should then be bonded to the inner leaf wall using thin joint mortar.
- A vertical slip plane bedded into conventional mortar (e.g. a strip of DPC material) should be placed between the Airtec reveal block and the inner face of the outer leaf to accommodate any differential movement between these two surfaces and avoid cracking.
- Other standard proprietary reveal systems used in masonry construction are also suitable for use in thin joint construction.



**Reveals can be formed from cut Airtec blocks with a slip plane of dpc placed at the interface with the outer leaf**

## Lintels

- Purpose made cavity and box lintels are available specifically for thin joint blockwork and should be used wherever possible. However, standard cavity and box masonry lintels can also be used.
- Once the desired course height is reached, the lintel bearing should be cut into the block at either end and the lintel should be bedded down using 1:6 cement:sand mix.
- Thin joint mortar should not be used to bed down lintels as it makes it far more difficult to accurately position the lintel than it does using a bed of 10mm cement:sand mortar.
- A piece of dpc under the lintel bearing will provide a good slip plane to accommodate movement.
- Lintel bearings should be cut into blocks so as to prevent a lintel bearing directly over a perpend of the course beneath.
- Airtec blocks can easily be cut down and used as infill above the lintel and maintain correct coursing height along the wall.
- Cavity lintels may require additional temporary support until the outer leaf is constructed.



## Cavity trays

Cavity trays especially designed for use in thin joint construction are available which bed into the inner leaf thin joint mortar.

Alternatively a simple and suitable cavity tray is the 'Type C' which is built into the outer leaf as the wall progresses and leans up against the inner leaf thin joint wall. Integral weep holes ensure that any moisture finds its way to the outside and keeps the cavity damp free.



## Floors & joists

Thin joint inner leaf cavity walls or solid walls are perfectly suited to accommodate timber, beam & block or precast concrete floors. All floor and roof joists should be tied to the blockwork using conventional lateral restraint straps in accordance with the Building Regulations Part A (Structure).

### Joist Hangers (timber floors)

- The coursing height of the inner leaf should always be correct at the point where joist hangers are used.
- The block bearing the joist hanger plate should not be recessed down to accommodate the hanger plate – the block above the hanger plate should be recessed to accommodate the plate which is usually thicker than the 2mm mortar joint.
- The hanger should bear directly onto a complete block with the back plate flat against the block.



### Built in Joists (timber, beam & block or precast concrete floors)

- The coursing height of the thin joint supporting wall should be designed so as to meet the joist level without the need to sand down the block to the right level.
- The joist should not be bedded directly onto the bearing blocks or surrounding blocks so as to allow for movement. Airtec blocks are easily cut to infill the space between joists in thin joint mortar and the rest of the wall simply carried on in thin joint.
- The gap between the joist and surrounding blockwork must be adequately sealed with a flexible sealant to prevent air leakage into the wall cavity.
- Whenever bearing onto a solid external (for example 200mm) wall a bearing of 100mm is recommended and the space at the end of the joist filled in with an Airtec block of suitable thickness.
- In the case of precast concrete floors (planks or beam & block), the course immediately above the floor should be laid in conventional 10mm mortar to correct any dimensional irregularities in the flooring components and ensure that subsequent thin joint courses are perfectly level.

**Course heights should be determined from the outset so that joist hanger plates and built-in joists should bear onto a full Airtec blocks rather than cut infill pieces.**

**The course above the built-in joist level should be laid in conventional mortar to take away any irregularities before continuing in thin joint mortar.**

## Roof Level

- The wall plate should be bedded onto the top course using conventional mortar as per normal practice for masonry construction.
- It is acceptable to use cut Airtec blocks as a coursing block onto which the roof plate is bedded. Irregularities in the cut coursing blocks can be easily accommodated in the conventional mortar bed to ensure accurate horizontal level is maintained at eaves level.
- Roofs suitable for any masonry wall construction are suitable for a thin joint supporting wall, including conventional trusses and cassette roofs.
- The use of lateral restraint straps and other standard bracing techniques in accordance with the Building Regulations and Codes of Practice is the same for thin joint constructed buildings as for any masonry construction.



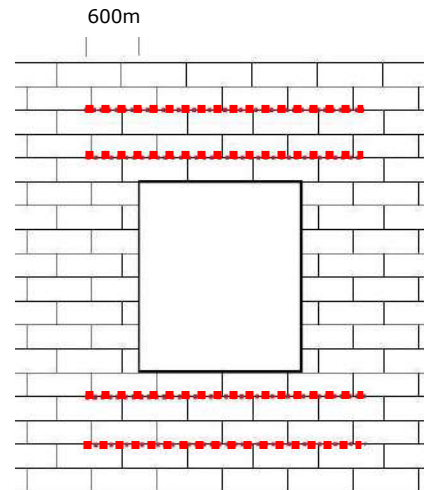


## Movement control

In common with all masonry walls, accommodation of movement should be planned in at the design stage. Lack of suitable movement joints may result in blocks and external finishes cracking, particularly so with thin joint whose mortar is much stronger than a cement:sand mix.

### General guidelines

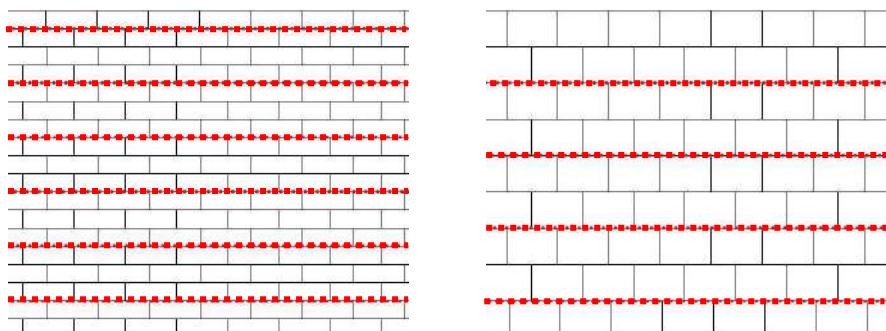
- On lengthy stretches of wall, vertical movement joints will be required every 6m maximum and also within 3m from a corner.
- A thin joint vertical movement joint tie should be used where possible (see the following page).
- Movement joints should not be used in acoustic separating walls. Bed joint reinforcement along the entire course should be used instead.
- Movement joints are required wherever different block types adjoin to one another. For example, wherever internal partitions or load-bearing walls abut the inner leaf of external walls.
- In sections of blockwork with no openings, movement control mesh should be used every 3 courses, or every 2 courses if using Airtec Large blocks.
- Movement control mesh should be placed in the 2 courses directly above and below openings, extending 600mm beyond the edges of the opening.
- Movement control mesh should be placed in the two courses below any area carrying loads (e.g. joists, beams, lintels).



**Movement control mesh should be placed above & below any opening and below any lintels & joists.**

### Horizontal movement control

- Flexible control mesh and thin joint designed bed joint reinforcement is ideal and will not affect the thickness of the mortar joint.
- The mesh is laid directly onto the clean, dust-free bed face of the block, and the mortar applied with the scoop as normal. The mesh may have to be held in place initially by the block layer whilst the mortar is being applied.
- At interfaces of mesh sections, they should be overlapped by at least 100mm. This may not be possible with thicker bed joint reinforcement.
- Horizontal mesh is suitable for party walls where vertical movement joints are prohibited.
- For externally rendered walls, bed joint reinforcement is more suitable than the use of vertical movement joints.



**In large sections of walls without openings, movement control mesh should be placed every 3 courses for Airtec wall blocks and every 2 courses for Airtec Large Format blocks. This is also suitable for party walls.**

## Vertical movement joints

- On lengthy stretches of wall, vertical movement joints will be required every 6m maximum and also within 3m of a corner.
- Vertical movement joints are formed in the same way as with conventional masonry and filled with a suitable compressible material.
- Stainless steel 'movement ties' designed for thin joint mortar should be fitted at no more than 300mm vertical centers. This means in effect a movement tie at every course across the movement joint.
- The movement ties are firmly bedded into the thin joint mortar on each side of the movement joint and a flexible 'loop' section spanning the joint allows for any expansion or contraction.
- Vertical movement joints should be placed wherever different materials or Airtec product grades adjoin one another.
- Across the bed face, there should be one tie per 100mm thickness of block. Therefore on a 190mm or 215mm Airtec block, two ties should be used across the movement joint evenly spaced.
- Adjoining and intersecting walls which require vertical movement accommodation (e.g. where different materials abut one another) can be tied using special stainless steel 'abutment' ties.
- These are face-fixed into one wall using expanding nylon nails and the other end is embedded into the mortar joint of the other wall.



The movement tie

**Vertical movement ties should be placed across every course and bedded into the thin joint mortar. For Airtec 190mm and 215mm thick blocks, use two ties.**



The abutment tie

## Wall junctions and adjoining walls

- For situations where vertical movement accommodation is not required (i.e. where walls are butt-jointed together) a simple 'crosswall' tie should be used. These are face-fixed into one wall using expanding nylon nails and the other end is bedded into the thin joint mortar of the other wall.
- This is particularly suitable for situations in which the courses of the two adjoining walls do not match and allows the builder to keep the internal area of the building free of any non-buttressing internal dividing walls until required.

### **A special note on expandable nylon nail fixings:**

Expandable nylon nails hammered into an Airtec block provide an excellent and permanent anchor for fixings. Higher strength Airtec Seven and Airtec Ten blocks are tougher and may cause the nylon nail to bend. If so, a steel screw anchor (e.g. Clan 'Drivefix') may have to be used and a 5mm pilot hole drilled into the block.

- In situations where abutting walls are at the same coursing height (i.e. a thin joint internal dividing wall abutting a thin joint inner leaf) a simple straight, flat 'connector' wall tie can be used.



The crosswall tie



The connector tie

## Cavity wall ties

Only wall ties specifically designed for use with thin joint construction should be used. Conventional wall ties are not suitable as the courses of the inner and outer leaves do not coincide and the mortar beds are only 2-3mm thick.

### The helical twist tie

*For thin joint inner leaf to conventional outer leaf*

These are the simplest and fastest type wall tie to use. These steel twist ties are widely available and are hammer driven into the face of the inner leaf block at the coursing height of the outer brick or block outer leaf.

- These ties can incorporate a clip to hold partial-fill insulation slabs and are simply driven through the insulation into the Airtec block.
- There is no drip incorporated into these ties because water cannot travel along the helix (in effect multiple drips) and ties should be installed perfectly horizontal.
- Helical twist ties can suit wider cavities up to 150mm. However, when cavities extend wider than 125mm, more ties per m<sup>2</sup> will have to be used therefore greatly reducing any thermal u-value benefit brought about by extra thickness insulation.
- They should be driven 65-75mm into the Airtec inner leaf and bed into 70mm of the brick or block conventional mortar outer leaf.
- A special fixing tool holds the tie steady whilst the handle of the tool is hammered thus driving the twist tie into the Airtec block.
- Twist ties should not be hammer driven into the inner leaf Airtec block until the wall is fully supported at the head by the floor joists or beams.



**Ties should be placed at 900mm centers horizontally and 450mm centers vertically – approx 2.5 ties per m<sup>2</sup>.**

**However, for cavities greater than 125mm, more ties per m<sup>2</sup> will have to be used which will worsen the u-value of the wall**

### Bedded in ties

*For thin-joint to thin-joint walls*

This tie is only suitable for thin joint to thin joint walls where the courses align together, for example adjoining inner leaf external walls to internal walls or thin joint cavity separating walls.

- Each end of the tie is bedded into the thin joint mortar and no driving into the block is required.
- These ties can suit cavities up to 125mm.
- For acoustic separating walls, only certain wall ties can be used. For example: Clan PWT4, Ancon Staifix HRT4

#### **A special note on thin-joint to thin-joint external walls:**

A thin joint outer leaf is not recommended as there is no significant improvement in u-value and a reinforced render finish will be required. If using a rendered Airtec outer leaf, we recommend building the external leaf in 10mm conventional mortar.





# Tools and Components

## Mortar:

Thin Joint mortar is widely available in the form of 25kg bags of dry, pre-mixed powder. Mixing is simply done by adding water to the powder according to the instructions on the bag and if made correctly will ensure that the correct mortar strength is achieved for use with aerated blocks. The table opposite shows approximate yield per bag for a given block thickness.

100mm	8.0 m <sup>2</sup> /bag
125mm	6.4 m <sup>2</sup> /bag
140mm	5.7 m <sup>2</sup> /bag
190mm	4.2 m <sup>2</sup> /bag
215mm	3.7 m <sup>2</sup> /bag
Airtec Large	12.7 m <sup>2</sup> /bag

The above does not allow for site wastage

## Essential Tools

### Mortar Scoops

These serrated trowels are available in widths to suit the block thickness and ensure the correct thickness of mortar is applied and fully fills the bed and perpend.



### Hand Saws

These large-toothed saws are especially designed to easily cut aerated concrete blocks. Normal wood saws can be used but take longer to cut through the blocks.



### Helical tie fixing tool

These simple tools hold the wall tie steady whilst the handle of the tool is hammered. This drives the tie straight into the Airtec block to the correct depth.



### Electric Whisk

An electric stirrer (with whisk attachment) for easy, quick and consistent mixing of the thin joint mortar powder with the water.



### Power saws

Circular or band saws should be used wherever possible to ensure accurate and smooth cutting of blocks with minimal effort and damage.



### Rubber Mallet

This is used to tap the blocks onto the bed mortar and onto the perpend to get a perfectly level and air tight bonding.



### Cutting Square

When cutting blocks by hand, maintaining squareness and dimensional accuracy is critical in thin joint construction. This tool helps to assure accurate and easily repeatable cutting.



### Levelling Rasp

This tool can easily correct any out of level areas and wherever coursing heights need slight adjustment throughout the build of the thin joint envelope.



## Other items you may need

- Large mixing bucket
- Stiff brush
- Wall chaser
- Laser level
- Sanding block
- Hole cutting / boring attachments

# Site Procedure

## Handling and Preparation of Airtec Blocks

In common with all aerated concrete blocks, Airtec blocks are susceptible to impact damage and should be handled with care. Packs on pallets should be stored on dry, firm level ground no more than 4 packs high. Protect Airtec blocks from adverse weather, especially if the packs have been opened. Overly wet blocks can delay the setting of the Thin Joint mortar. Allow any wet blocks to dry out for as long as possible before use.



Further recommendations on site practice for Airtec blocks can be found in our Airtec brochure and on our website: [www.thomasarmstrongconcreteblocks.co.uk](http://www.thomasarmstrongconcreteblocks.co.uk)

- Remove any dust, dirt or debris on the block face using a stiff brush.
- Completely dry blocks can create excess suction of moisture from mortars, plasters and renders initially; this can result in lower adhesion. To overcome this, we recommend that on very dry blocks the block face accepting the mortar, plaster or render should be lightly brushed / sprayed with water immediately prior to application. Do not over-wet the blocks!
- It is absolutely essential that the first course is laid accurately level to +/-1mm using conventional mortar and left to cure overnight. Only then can thin joint laying commence.
- Airtec blocks can be abrasive and generate dust when cut or sanded. Wear protective clothes, gloves and eye protection.

## Preparation of the Mortar



The thin-joint mortar is supplied in 25kg bags and is simply added to water (typically 5 to 6 litres) in a large 50 litre clean bucket.

The manufacturer's instructions are printed on the bags and must be adhered to for the best results.



The mix should be made in a large bucket using a whisk and electric stirrer set to a slow-medium speed.

Whisk until smooth and leave to stand for several minutes then whisk again briefly. The mix should have the consistency of porridge.



Tip: Keep a bucket of clean water next to you to rinse mortar off the tools to prevent sticking throughout the block laying process.

- *The mortar in the bucket should remain workable for up to 4 hours after mixing. However, mortar life and workability **cannot** be extended by adding more water. Workability can often be recovered by whisking again with the electric stirrer.*
- *Once applied to the block, the mortar remains workable for only 5-10 minutes depending on the ambient temperature and humidity.*
- *Bags of thin joint mortar should not be left opened for prolonged periods. Ideally use a full bag each time mortar is prepared.*
- *It is not advisable to use thin joint mortar in temperatures below 5°C.*

**The mortar colour can be closely matched to Airtec blocks by the addition of 40ml of black mortar colour solution (e.g. Everbuild) to the water prior to adding the powder.**



## Block Laying



The specially serrated scoops ensure a mortar bed of the correct width and thickness with the minimum of effort. Choose the correct width of scoop to suit the block thickness. For wider blocks, two or more lines of mortar may need to be applied using a narrower scoop.

Fill the scoop with mortar and hold the scoop at an angle so that the wings of the scoop are not against the block.



Wiggle the scoop as you go up or along the bed face to ensure good coverage across the face. Rinse the scoop in water to prevent build-up and clogging.

All mortar joints and perpends must be fully filled.

Present a mortared perpend to a dry perpend and tap firmly into position with a rubber mallet.



Tap the block firmly with a rubber mallet to get a tight fit between the blocks and clean off excess mortar squeezed out of the joint.

Check for horizontal and vertical level and adjust as necessary. The mortar begins to adhere strongly after approximately 5 - 10 minutes!

- *Small plastic levelling wedges can be tapped into the horizontal joint to correct any situations where the level of the blocks need correction. Alternatively, the course can be made level by using the rasp tool to sand down the blocks.*
- *Unlike conventional mortar construction, there is no need to raise corners independently as thin joint mortar sets very quickly.*

## Finishing Off



Airtec blocks are easily sawn using an aerated block handsaw. Ideally, band or circular saws should be used to get clean, repeatable and accurate cuts.



A wide range of special fixings and ties are available to physically join blocks together prior to applying the mortar; for example, at internal wall junctions (see pages 13-14).



Airtec blocks can be easily shaped to suit most situations as in this example with a curved roof.

## Supporting the Walls During Construction

Normally in Thin Joint construction the inner leaf can be built well ahead of the outer leaf. However, if there is a delay due to weather conditions for example, the inner leaf wall should be supported and propped suitably until such time it can be tied to the outer leaf. Similarly in bad weather, the exposed inner leaf should be protected as far as possible.



# Quick Reference Guide

## Airtec Blocks

- Store blocks on firm level ground no more than 4 packs high
- Protect from the weather and do not allow the blocks to get wet. Allow wet blocks to dry before use.
- In hot, sunny conditions, bed surfaces may need wetting immediately prior to applying any mortar, render or plaster
- Airtec Large Format blocks (620mm x 430mm) are low weight and result in excellent u-values. However, due to their size they can be tricky to handle and lay above shoulder height. Consideration should be given to organizing scaffolding so as to avoid laying large blocks above shoulder height.

## Mortar

- Follow the instructions on the bag and use the whole bag at once. Use clean water to mix the mortar.
- A bag's worth of mixed mortar remains workable for approximately 4 hours.
- Do not add water to make re-workable. Use the whisk to regain workability.
- If desired, the mortar colour can be closely matched to Airtec blocks by the addition of 40ml of mortar colour solution (e.g. Everbuild) to the water before adding the powder.
- Always keep a bucket of water next to you to rinse off the mortar scoop between each use.

## Tools

- For best results always use thin joint scoops to get uniform joints at the correct thickness.
- Cutting must be accurate and level. A band saw is perfect for this. If using a hand saw, use a cutting guide square to achieve accurate cuts.
- Airtec blocks used in thin joint should not be cut with a bolster & chisel.
- Use a rubber mallet to tap the blocks into place during laying.

## Movement

- Vertical movement joints should be used where wall lengths reach 6m and wherever walls made from dissimilar materials adjoin / abut.
- Use thin joint movement ties at every course across the movement joint.
- Horizontal bed joint reinforcement mesh should be used across the 2 courses under and above openings and extend 600mm beyond the opening (see page 12).
- Horizontal movement mesh should be used below any point loads such as joists, lintels and beams.

## Wall ties

- Helical twist ties can be hammered into the face of the inner leaf at any point and bedded into the mortar of the outer leaf.
- For cavities wider than 125mm, more ties per m<sup>2</sup> will have to be used which will worsen u-values and to some extent negate any thermal advantage brought about by any added insulation.
- A range of ties suitable for bedding into 2-3mm thin joints are available – do not use ties specified for conventional mortar. For Party Walls, only use allowed ties as specified (see page 8)

## Setting out, laying & good practice

- There is no need to raise corners and it is not recommended. Build course by course.
- The first course of the walls must be laid in 10mm cement:sand mortar and made perfectly level. The perpends must be joined using 2-3mm thin-joint mortar.
- Lintels should be bedded into a cut Airtec block as a bearing using conventional cement:sand mortar and a dpc slip plane placed beneath the lintel bearing.
- Joist hanger plates, beams and built-in joists should bear onto full, uncut Airtec blocks.
- The course above built-in beams and joists should be laid using 10mm cement:sand mortar to allow adjustment to perfect level for subsequent thin-joint courses.
- Cut Airtec blocks can be used as reveals and cavity closers. A strip of dpc bedded into conventional cement:sand mortar should be used between the Airtec reveal and the outer leaf.

## Further Information

### **Our website: [www.thomasarmstrong.co.uk](http://www.thomasarmstrong.co.uk)**

Find out more about Airtec blocks as well as our complete and comprehensive range of conventional lightweight, super-lightweight and dense concrete blocks, bricks and specials as well as our range of paving blocks, kerb setts and cobbles. *Visit the 'Concrete Blocks' section.*

### **Our Airtec BBA Certificate 06/4309**

Available to download from our website, this set of five detail sheets show all technical characteristics of the blocks and show exactly how Airtec blocks comply with all relevant building regulations and codes as well as handling and using these blocks.

*Download our BBA certificate from [www.thomasarmstrong.co.uk](http://www.thomasarmstrong.co.uk)*



### **Thin Joint Technology Limited**

Thin joint technology Ltd / Clan Products Ltd have for many years been at the forefront of promoting thin joint construction in the UK and are the country's leading experts in the field. They are continually working on innovative building solutions to meet future regulations yet keep the building simple, cost-effective and repeatable. The SIM wall system is one such solution.



Thomas Armstrong and Thin Joint Technology have worked closely on several projects for a number of years and we thoroughly recommend them as an authoritative and experienced source of information on anything to do with this building technique.

*Visit the Thin Joint website on [www.thinjoint.com](http://www.thinjoint.com)*

### **Robust Details**

Robust Standard Details for party walls are being continually updated and added to and the latest versions are listed on their website. We strongly recommend checking with them for the very latest versions as the details contained in this guide could be superseded by a change or update at any time.

*Visit the Robust Details website on [www.robustdetails.com](http://www.robustdetails.com)*

**robust**details

### **Aircrete Products Association (APA)**

Thomas Armstrong (Concrete Blocks) Limited are a member of the Aircrete Products Association. The APA is the authoritative body representing the UK aerated concrete manufacturing industry both nationally and internationally and sets a benchmark of excellence for this superior, sustainable building product.

*Visit the APA website on [www.aircrete.co.uk](http://www.aircrete.co.uk)*



## About us

Airtec blocks are part of a comprehensive range of concrete block and paving products manufactured by Thomas Armstrong (Concrete Blocks) Ltd across the North East and North West of England.

**Pickhill, Thirsk, North Yorkshire** Tel: 01845 567282

Manufacturer of conventional lightweight and dense solid and hollow concrete blocks, bricks, slips and other special products.

**Brompton-on-Swale, North Yorkshire** Tel: 01748 810204

Manufacturer of Airtec aerated concrete blocks.

**Rowlands Gill, Newcastle upon Tyne** Tel: 01207 544214

Manufacturer of conventional lightweight and dense solid and hollow concrete blocks, bricks, slips and other special products.

**Consett, Country Durham** Tel: 01207 505655

Manufacturer of rectangular and hexagonal paving blocks, kerb setts and cobbles

**The Thomas Armstrong (Holdings) Ltd group of companies also includes several well established and respected concrete block manufacturers:**

**Stocks Blocks Ltd, Leeds, West Yorkshire** Tel: 0113 2320022

Manufacturer of conventional lightweight and dense solid and hollow concrete blocks as well as Ultralite lightweight concrete blocks.

**William Rainford (Holdings) Ltd, Aintree, Merseyside** Tel: 0151 5255991

Manufacturer of conventional lightweight and dense solid and hollow concrete blocks and other special products.

**Coulthard's Concrete Products (1980) Ltd, Silloth, Cumbria** Tel: 01697 331324

Manufacturer of conventional lightweight and dense solid and hollow concrete blocks, bricks, slips and other special products as well as paving blocks, kerbs setts and cobbles.

**Barnetts (Buglawton) Ltd, Congleton, Cheshire** Tel: 01260 273170

Manufacturer of conventional lightweight and dense solid and hollow concrete blocks.



**STOCKS  
BLOCKS**



**COULTHARD'S  
CONCRETE PRODUCTS (1980)  
LIMITED**



**BARNETTS  
(BUGLAWTON)  
LIMITED**





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