

ARCHITECTURAL & HERITAGE STATEMENT

**In Support of an Application under Section 73 of the Town and
Country Planning Act 1990**

Variation of Conditions 8 and 9 of Listed Building Consent

Application Reference: 2022/92776

Site: Acre House Listed Buildings, Lindley

Prepared for: Kirklees Council Planning Department

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1. Executive Summary

This statement has been prepared by Farrar Bamforth in support of an application to vary Conditions 8 and 9 attached to Listed Building Consent reference 2022/92776 relating to the conversion and sub-division of the existing Acre House Buildings into residential dwellings.

The application does not seek to alter the approved layout, external appearance or overall design of the development. Instead, it seeks approval for revised construction specifications that have evolved during the detailed technical design stage following consultation with Kirklees Council Conservation Planning, Building Control and an independent Planning and Heritage Consultant.

The proposed amendments relate solely to:

- The incorporation of concrete blockwork within newly constructed internal separating walls between dwellings in accordance with Robust Detail E-WM-1 (Existing Main House and Cottages)
- The incorporation of concrete blockwork and Kingspan Kooltherm insulation within newly constructed infill cavity walls to existing wall lines (Existing Main House and Cottages)
- The incorporation of Kingspan Kooltherm insulation within independent internal wall linings (Cottages only)
- The incorporation of Kingspan Kooltherm insulation within a ventilated roof construction (Cottages only)
- The thermal upgrading of the existing suspended timber floors with Kingspan Kooltherm insulation (Main House only)
- The introduction of a carefully considered moisture-management strategy including cavity separation, variable vapour control membranes, retained ventilation and additional passive ventilation through the external masonry

The purpose of the proposed variations is not simply to improve thermal performance.

Rather, the proposals seek to achieve a balanced solution that enables the successful conversion of the listed building into high-quality residential accommodation whilst preserving its architectural and historic significance.

Particular emphasis has been placed upon retaining historic fabric, minimising irreversible intervention and preserving significant internal features, including the existing timber roof trusses, which would otherwise require concealment beneath a heavily insulated ceiling.

The revised construction strategy has been developed having regard to:

- the Planning (Listed Buildings and Conservation Areas) Act 1990;
- the National Planning Policy Framework;
- Policies LP24 and LP35 of the Kirklees Local Plan;
- Historic England's Building Performance Advice Series;

- BS 5250:2021+A1:2022 Management of Moisture in Buildings;
- Approved Documents C, E and L of the Building Regulations.
- The proposals are considered to represent a proportionate and conservation-led response to the technical requirements associated with the conversion of a listed building into separate residential dwellings.

2. Statement of Conservation Principles

The design and technical development of the proposed conversion have been guided by the principle that the long-term preservation of the listed building depends upon securing an appropriate, viable and sustainable use while retaining those elements that contribute to its special architectural and historic interest.

The proposed variations to Conditions 8 and 9 have therefore been developed in accordance with the following conservation principles.

Minimum Intervention

New work has been limited to that reasonably necessary to facilitate the approved residential conversion and to satisfy the functional requirements associated with modern occupation.

The proposals do not seek to replace historic construction unnecessarily. Existing masonry, suspended timber floors and roof structures will be retained wherever practicable, with new interventions introduced only where required to provide thermal performance, acoustic separation, building durability and occupant comfort.

Retention of Historic Fabric

The preservation of existing fabric has been a primary consideration throughout the design process.

The proposed independent internal wall linings avoid the need to bond insulation directly to existing masonry and reduce the extent of chasing, drilling or other disturbance to historic walls.

The existing suspended timber floor within the Main House will be retained and insulated between the existing joists rather than replaced with a new solid floor.

The existing roof structure will also be retained, subject to inspection and any necessary structural repairs.

Preservation and Appreciation of Significant Features

The substantial timber roof trusses form an important part of the architectural character of the cottages.

The proposed rafter-level insulation strategy has been selected specifically to allow the principal trusses to remain partially visible within the completed dwellings.

This approach preserves the legibility of the historic roof structure and allows the original form and construction of the building to remain appreciable following conversion.

A conventional ceiling-level insulation strategy would conceal these features and would therefore result in a less satisfactory heritage outcome.

Reversibility Where Practicable

The proposed insulated wall construction is formed independently of the existing external masonry.

This means that the new lining could, in principle, be removed in the future with substantially less impact upon the retained wall than a directly bonded or mechanically fixed insulation system.

The introduction of a separate service void further reduces the need to disturb either the historic masonry or the primary vapour control layer during installation, maintenance or future alteration.

Although complete reversibility cannot always be achieved within a residential conversion, the proposals seek to preserve the ability to remove or adapt new work without unnecessary loss of significant historic fabric.

Compatibility of New and Existing Construction

The building has evolved over time and already incorporates a combination of traditional and modern construction, including stone and brick masonry, variable-width cavities, concrete floors and areas of concrete blockwork.

The proposed construction strategy has therefore been developed in response to the building as it exists rather than by applying a generic solution intended for an unaltered traditional structure.

New materials are proposed only where they form part of a coordinated and technically justified construction system and where their use would not result in harm to the appearance or significance of the listed building.

Moisture Management and Building Durability

The Applicant recognises that the introduction of internal insulation alters the moisture behaviour of existing walls and must therefore be approached cautiously.

The proposed strategy has been developed around the management of moisture within the complete building envelope rather than reliance upon the characteristics of an individual product.

The strategy incorporates:

- assessment of the existing wall construction
- an independent insulated lining
- a nominal cavity between the retained wall and new lining
- a proprietary variable vapour control membrane

- an independent service zone
- passive ventilation through the proposed air sleeves
- retained sub-floor ventilation
- a ventilated roof construction
- careful detailing at junctions and openings
- a specialist condensation risk assessment to support the final specification

This approach reflects the risk-based principles of BS 5250 and responds directly to advice received from Kirklees Conservation Planning and Building Control.

Legibility of New Work

The proposals seek to retain a clear distinction between surviving historic construction and new work introduced as part of the approved conversion.

The new party walls, internal linings and service zones are contemporary interventions serving the new residential use. They do not seek to imitate historic construction or present themselves as original fabric.

At the same time, they will be visually recessive and concealed behind appropriate internal finishes so that they do not compete with significant historic features.

Long-Term Sustainable Use

The approved conversion into three residential dwellings provides a viable future for the listed building.

The proposed thermal and acoustic upgrades are intended to create accommodation that is comfortable, energy efficient and capable of successful long-term occupation.

This is important because an unsuitable or poorly performing conversion could lead to persistent condensation, occupant dissatisfaction, repeated alteration or eventual disuse, all of which would be detrimental to the long-term conservation of the heritage asset.

The proposed variations therefore support the continued beneficial use, maintenance and preservation of the listed building.

Balanced Conservation Judgement

The proposals do not seek to achieve modern building performance at any cost.

They represent a balanced judgement between:

- preservation of significance
- retention of historic fabric
- moisture management
- thermal performance
- acoustic performance

- Building Regulations compliance
- the practical requirements of residential occupation

Modern materials are proposed only where they contribute to a coordinated solution that minimises intervention, preserves significant features and secures the building's viable future.

Taken as a whole, the proposals are considered to represent a conservation-led approach that preserves the special architectural and historic interest of the listed building while enabling its sensitive adaptation for continued use.

3. Introduction

This report accompanies an application under Section 73 of the Town and Country Planning Act 1990 seeking to vary Conditions 8 and 9 attached to Listed Building Consent reference 2022/92776.

The proposed development has already been granted Listed Building Consent. The principle of converting the listed building into residential dwellings has therefore been accepted.

During progression of the project into the technical design stage, detailed discussions have taken place with Kirklees Council Conservation Planning, Building Control, specialist manufacturers and an independent Planning and Heritage Consultant regarding the most appropriate method of upgrading the thermal and acoustic performance of the existing building.

Those discussions have identified that limited amendments to the approved specifications would enable a more balanced solution to be achieved.

The proposed amendments are entirely internal in nature and would not alter:

- The external appearance of the listed building
- Its architectural character
- Its setting
- The approved layout
- The approved residential use

Instead, they relate solely to the construction methods adopted to satisfy the functional requirements of modern residential occupation whilst preserving the significance of the designated heritage asset.

The proposals have therefore been developed in accordance with established conservation principles, namely:

- Minimum intervention
- Retention of historic fabric
- Reversibility wherever reasonably practicable
- Honesty of repair
- Compatibility between historic and new construction
- Long-term sustainability of the listed building

The proposals should therefore be viewed as refinements to the technical design rather than amendments to the approved heritage scheme.

4. The Listed Building

Acre House and the Cottages are comprised of historic listed buildings that have evolved over a considerable period of time.

As is common with many listed buildings that have remained in active use over successive generations, the building no longer represents a wholly untouched example of traditional construction.

Previous alterations have introduced a variety of later construction methods and materials, including areas of concrete floor construction, cavity wall construction and internal concrete blockwork and reinforced concrete lintels / supports for floors to main building and the removed link extension.

Consequently, the building should properly be understood as a historic structure that has adapted throughout its lifetime, rather than as a purely traditional solid-wall building.

The approved conversion seeks to secure the long-term viable use of the listed building through its adaptation to provide residential accommodation.

Historic England recognises that the continued beneficial use of a listed building is often the most effective means of ensuring its ongoing conservation and maintenance.

The proposals contained within this application have therefore been developed to support that long-term objective whilst ensuring that the significance of the listed building is preserved.

Particular importance has been placed upon retaining existing historic structural elements wherever reasonably practicable.

This is especially relevant in relation to the existing roof structure, where the proposed insulation strategy has been developed specifically to retain the principal timber trusses as visible features within the completed dwellings.

5. Legislative and Planning Policy Context

Section 16(2) of the Planning (Listed Buildings and Conservation Areas) Act 1990 requires the Local Planning Authority to have special regard to the desirability of preserving a listed building, its setting and any features of special architectural or historic interest which it possesses.

Similarly, Section 66(1) places a statutory duty upon decision-makers to have special regard to the desirability of preserving listed buildings when considering proposals affecting them.

The National Planning Policy Framework recognises that heritage assets are an irreplaceable resource and should be conserved in a manner appropriate to their significance. It also recognises that conservation should not prevent appropriate adaptation where this secures the optimum viable use of a heritage asset.

Policies LP24 and LP35 of the Kirklees Local Plan similarly seek to ensure that proposals preserve or enhance heritage significance whilst allowing sensitive alterations that sustain the long-term use of designated heritage assets.

The purpose of this application is entirely consistent with those objectives.

The proposed variations do not seek additional development.

They seek only to refine the approved technical construction in order to better balance the conservation of the listed building with the practical requirements associated with its residential conversion.

This report demonstrates that the proposed construction strategy achieves that balance whilst preserving the significance of the listed building.

6. Existing Building Construction

An understanding of the existing construction is fundamental when considering the proposed variation of Conditions 8 and 9.

Whilst Acre House Cottages are a designated heritage asset, the buildings no longer comprise a wholly traditional breathable construction. Previous alterations undertaken over many years have introduced a variety of later construction methods and materials which now form part of the existing building fabric.

These include:

- Existing concrete ground floor construction within the Cottages
- Existing concrete first floor construction within the Cottages
- Existing masonry cavity wall construction, with cavity widths varying between approximately 30 mm and 100 mm to the Cottages
- Areas of internal concrete blockwork to the Main House and Cottages
- Existing solid masonry construction comprising stone and brickwork to the Main House
- Existing suspended timber floors to the Main House
- Existing substantial timber roof trusses and traditional roof construction to the Cottages

Consequently, the building represents a combination of traditional and later construction techniques rather than a wholly untouched historic structure.

This existing construction is an important consideration when assessing the appropriateness of the proposed variations.

Historic England's guidance recognises that every historic building should be assessed on its own merits and that retrofit proposals should respond to the specific characteristics of the individual building rather than adopting a universal approach.

The proposed construction strategy has therefore been developed specifically for Acre House and Acre House Cottages, taking account of the existing building fabric, previous alterations and the intended long-term residential use.

7. Background to the Proposed Variations

Listed Building Consent was granted subject to a number of conditions intended to safeguard the special architectural and historic interest of the building.

Conditions 8 and 9 sought to encourage the use of traditional breathable construction techniques by preventing the use of vapour barriers, rigid PIR insulation products and cement or concrete construction.

At the time permission was granted, the detailed technical design of the residential conversion had not been fully developed.

As the project progressed into the technical design stage, detailed coordination became necessary between the architectural proposals, Building Regulations requirements and the practical constraints presented by the existing building.

Particular consideration was required in relation to:

- Thermal performance
- Acoustic separation between dwellings
- Moisture management
- Condensation risk
- Ventilation
- Structural constraints
- Preservation of historic fabric

As a consequence of this design development, it became apparent that limited revisions to the approved specifications would provide a more balanced and less intrusive solution than the originally approved construction.

The proposed variations therefore represent an evolution of the technical design rather than any change to the approved heritage strategy.

8. Consultation with Kirklees Council and Specialist Advisors

The Applicant has sought to develop the proposed construction strategy through consultation with Kirklees Council Conservation Planning, Kirklees Building Control and an independent Planning and Heritage Consultant.

These discussions have been invaluable in identifying both the opportunities and potential risks associated with upgrading the thermal performance of a listed building.

Senior Conservation Officer

The Senior Conservation Officer acknowledged that the existing building already incorporates a degree of modern construction, including concrete floors and cavity wall construction.

Following discussions with Kirklees Planning Conservation Officer and Building Control, it was suggested that an application under Section 73 could be submitted seeking the variation of Conditions 8 and 9, supported by a detailed technical justification addressing the management of potential moisture risks.

Reference was made to Historic England guidance relating to internal wall insulation, recognising that moisture management is a key consideration when introducing internal insulation to traditional buildings.

The advice specifically identified the importance of demonstrating how any potential moisture accumulation within the retained masonry would be mitigated through the proposed design.

The current submission has been prepared directly in response to that advice.

Kirklees Building Control

Discussions with Kirklees Building Control focused primarily upon the technical performance of the proposed construction.

Building Control recognised that the existing wall constructions vary considerably throughout the development and requested further information regarding the composition of the existing masonry in order that the suitability of different construction approaches could be considered.

Subsequent discussions confirmed that the incorporation of vapour-resistant construction should ultimately be regarded as a design decision requiring appropriate technical justification rather than a matter capable of absolute approval or rejection in principle.

Building Control advised that any application seeking to vary the Listed Building Consent conditions should demonstrate how moisture management, condensation risk and cold bridging had been considered with reference to BS 5250.

Advice was also given that supporting construction together with condensation risk analysis would assist the assessment of the proposals.

The Applicant intends to submit a condensation risk assessment prepared by the insulation manufacturer together with the detailed construction drawings as supporting information.

Independent Planning and Heritage Consultant

The Applicant also sought independent advice from a Chartered Planning and Heritage Consultant regarding the heritage implications of the proposed thermal upgrade.

The consultant concluded that the internal faces of the cottage walls contain little architectural detailing that contributes to the significance of the listed building and therefore considered that thermal upgrading could be undertaken without material harm to the heritage significance of those spaces.

Whilst recognising the Conservation Officer's concerns regarding potential moisture accumulation, the consultant considered that, provided the Architect and Building Control were satisfied that moisture risks had been appropriately assessed having regard to Historic England guidance, the proposed solution represented a balanced conservation decision.

In relation to the roof, the consultant similarly identified no heritage objection in principle to the incorporation of rigid insulation, subject to appropriate detailing and the retention of effective roof ventilation.

The advice received from all parties demonstrates a consistent approach.

None of the consultees objected to the principle of varying Conditions 8 and 9.

Instead, each identified the importance of ensuring that the proposed construction is supported by an appropriate technical justification demonstrating how moisture movement, ventilation and long-term durability have been addressed.

The proposals contained within this report have been developed accordingly.

9. Existing Conditions

The current Listed Building Consent includes the following conditions relevant to this application.

Condition 8

"All insulation to be used in any part of the works within the buildings or roofs shall be entirely permeable and not make use of vapour barriers. There shall be no use of any synthetic or artificial materials, such as Kingspan, Celotex or similar PIR boarding."

The intention of this condition is clearly to minimise the potential for moisture accumulation within the historic building fabric.

This objective is fully supported by the Applicant.

However, subsequent technical design has identified an alternative strategy that is considered capable of achieving this objective whilst simultaneously providing significant heritage benefits through the retention of historic structural features and minimising intervention into existing fabric.

Condition 9

"There shall expressly be no use of cement or concrete in any part of the proposed works."

The intention of this condition is to discourage unnecessary use of modern materials where traditional alternatives would better preserve the character of the listed building.

Again, the Applicant fully supports that conservation objective.

However, detailed design has demonstrated that limited use of concrete blockwork within wholly new internal party walls and infill sections of cavity walls tied in to the existing building fabric provides the most reliable means of achieving the acoustic standards required for the approved residential conversion.

Importantly, the proposed blockwork does not replace historic fabric, does not alter the appearance of the listed building and will remain entirely concealed within new internal wall constructions.

The proposed variation therefore seeks only a limited and proportionate relaxation of the condition where justified by the technical requirements of the approved conversion.

10. The Need for a Balanced Conservation Approach

Historic buildings inevitably present a balance between conservation and adaptation.

The approved conversion introduces new residential use into a building that was not originally designed to satisfy modern expectations for thermal efficiency, acoustic separation or occupant comfort.

The purpose of the proposed variations is not to maximise thermal performance nor to introduce modern materials unnecessarily.

Rather, the revised construction strategy seeks to achieve the optimum balance between:

- Preserving the significance of the listed building
- Retaining historic fabric
- Allowing appreciation of historic structural elements
- Complying with modern Building Regulations
- Managing moisture responsibly
- Ensuring the long-term durability of the building
- Securing the sustainable residential use of the heritage asset

It is considered that this balanced approach is entirely consistent with the objectives of national planning policy, Historic England guidance and the statutory duty to preserve the significance of listed buildings.

11. Justification for the Variation of Condition 9

Proposed Internal Party Wall Construction & Infill Cavity Wall Constructions

Existing Condition

Condition 9 states:

"There shall expressly be no use of cement or concrete in any part of the proposed works."

The Applicant fully understands the purpose of this condition.

The avoidance of unnecessary cementitious materials is a well-established conservation principle intended to minimise the introduction of incompatible modern construction into historic buildings. The objective of the condition is therefore supported.

However, following progression into the detailed technical design stage it has become apparent that the complete prohibition of concrete products places significant constraints upon the successful conversion of the listed building into separate residential dwellings.

The proposed variation therefore seeks only a limited and carefully justified relaxation of the condition.

Requirement for Acoustic Separation

Unlike the historic use of the building, the approved conversion creates three independent residential dwellings.

This introduces statutory acoustic performance requirements under Approved Document E of the Building Regulations which did not exist when the building was originally constructed.

Providing suitable acoustic separation is fundamental to creating dwellings capable of long-term occupation and contributes directly to the sustainable future of the listed building.

Failure to provide appropriate acoustic separation would adversely affect residential amenity and compromise the quality and longevity of the conversion.

Proposed Construction

It is proposed that the principal separating walls between dwellings are constructed using **Robust Detail E-WM-1**.

The Robust Details Scheme has been developed to provide reliable acoustic performance for attached dwellings and represents one of the most widely recognised methods of satisfying the sound insulation requirements of Approved Document E.

The proposed construction comprises new internal wall construction only.

No historic masonry is proposed to be replaced with concrete blockwork.

No external walls are affected.

No external appearance is altered.

The blockwork will remain completely concealed behind plaster finishes following completion of the works

Existing Construction Context

An important consideration is the existing construction of the listed building.

The building already incorporates significant areas of later construction, including:

- concrete ground floor construction
- concrete first floor construction
- cavity wall construction
- areas of concrete blockwork

The proposal should therefore be considered within the context of the building as it exists today rather than as a wholly traditional solid-wall structure.

The proposed use of concrete blockwork does not represent the introduction of an entirely alien material into an otherwise untouched historic building.

Instead, it forms a limited element of new internal construction within a building that has evolved over many decades.

Heritage Impact

The proposed blockwork forms entirely new construction introduced solely to facilitate the approved residential conversion.

It does not involve:

- removal of significant historic fabric
- alteration to the external appearance
- alteration to the architectural character
- alteration to the historic plan form beyond that already approved

Once completed, the blockwork will not be visible.

Consequently, its impact upon the significance of the listed building is considered to be negligible.

Conversely, its inclusion enables the approved residential conversion to achieve the acoustic standards necessary for successful long-term occupation, thereby supporting the optimum viable use of the heritage asset.

The proposal is therefore considered to preserve the significance of the listed building whilst facilitating its continued use.

Proposed Additional Wall Constructions

In addition to the previously described insulation strategy, two further wall constructions are proposed to facilitate the alterations to the existing building whilst maintaining compatibility with the historic fabric.

Former Link Extension to the Cottages

Following the removal of the later link extension adjoining the cottages, sections of external wall require reconstruction. These walls are proposed to comprise an infill cavity wall construction formed using matching reclaimed natural stone externally, a concrete blockwork inner leaf, and a clear residual cavity. The new masonry will be carefully tied into the retained historic building fabric using stainless steel wall starter systems and appropriate masonry ties, ensuring structural continuity whilst maintaining the overall wall width and appearance of the existing construction.

The use of reclaimed stone will ensure that the repaired elevations closely match the existing historic masonry in terms of material, colour, texture and coursing, preserving the architectural character of the listed building whilst providing a durable replacement for the removed sections.

Main House Interface

Where new construction abuts the retained solid masonry walls of the principal house, the proposed wall build-up similarly comprises matching reclaimed natural stone externally, a 100 mm Kingspan Kooltherm K108 insulated cavity, and a concrete blockwork inner leaf, tied back to the existing solid masonry using proprietary stainless steel wall starter systems. This approach provides an appropriate thermal transition between the retained historic construction and the new works, whilst maintaining continuity of the external appearance and minimising thermal bridging.

The insulated cavity construction has been independently assessed by Kingspan, achieving a calculated U-value of 0.16 W/m²K, and has been designed in accordance with current Building Regulations and recognised moisture management principles. Although the assessment predicts a limited degree of seasonal moisture accumulation within the cavity wall, this occurs within the new cavity wall construction rather than the retained historic masonry and is considered acceptable when installed in accordance with the manufacturer's specification.

Additional Wall Construction Proposals

The proposed wall constructions have been developed to ensure that all replacement masonry is readily distinguishable in terms of construction methodology whilst remaining visually sympathetic to the listed building. The use of matching reclaimed stone retained cavity widths, breathable construction principles where appropriate, and carefully detailed interfaces with the existing masonry enables the alterations to achieve improved thermal performance without compromising the significance or long-term durability of the historic fabric. This approach accords with the conservation principles set out in the National Planning Policy Framework, Historic England guidance on the adaptation of traditional buildings, and BS 5250:2021 regarding the management of moisture within building fabric.

12. Justification for the Variation of Condition 8

Existing Condition

Condition 8 states:

"All insulation to be used in any part of the works within the buildings or roofs shall be entirely permeable and not make use of vapour barriers. There shall be no use of any synthetic or artificial materials, such as Kingspan, Celotex or similar PIR boarding."

The intention of this condition is clearly to minimise the potential for moisture accumulation within the retained historic fabric.

The Applicant fully supports this objective.

The proposed variation does not seek to disregard that principle.

Instead, it proposes an alternative strategy that manages moisture through the careful design of the complete building element rather than through reliance upon the permeability of a single material.

Evolution of the Design

As the project developed into the technical design stage, it became evident that achieving an appropriate balance between:

- Thermal performance
- Moisture management
- Retention of historic fabric
- Preservation of significant architectural features
- Building Regulations compliance

required a more holistic approach than originally anticipated.

The revised proposals have therefore been developed following consultation with Conservation Planning, Building Control, an independent Heritage Consultant and specialist manufacturers.

Internal Wall Construction

The proposed wall construction has been specifically designed to minimise intervention into the existing historic masonry.

The proposed build-up comprises:

- Retained existing masonry wall
- Existing cavity where present

- Nominal 25 mm residual cavity
- Independent timber stud framework
- 70 mm Kingspan Kooltherm K112 insulation
- Proprietary variable vapour control membrane
- Independent service zone
- 37.5 mm Kingspan K118 insulated plasterboard

This arrangement has been selected for several reasons.

Firstly, the insulated lining is entirely independent of the existing masonry.

The proposal therefore avoids extensive mechanical fixing, adhesive bonding or chasing into the historic walls.

Secondly, the independent service zone allows electrical and plumbing installations to be accommodated without damaging the retained masonry.

Thirdly, the proposed construction remains capable of future removal with comparatively limited impact upon the original building fabric.

These characteristics are entirely consistent with accepted conservation principles of minimum intervention and reversibility.

Roof Construction

The cottages roof construction represents one of the most significant heritage benefits arising from the proposed variation.

The approved condition would necessitate the use of substantial depths of mineral wool insulation at ceiling level in order to achieve the thermal performance required for new residential accommodation.

In practical terms this would require the introduction of new horizontal ceilings concealing the substantial historic timber roof trusses.

Those trusses form an important component of the internal architectural character of each dwelling.

The revised proposal instead incorporates a ventilated warm roof construction comprising insulation positioned between and beneath the rafters.

The roof build-up retains a continuous 50 mm ventilation zone above the insulation together with permanent high- and low-level roof ventilation in accordance with recognised good practice.

The existing roof structure will remain partially visible within the completed dwellings, allowing future occupants to continue to appreciate the original form and craftsmanship of the building.

The proposal therefore provides a positive heritage outcome by preserving a significant historic feature that would otherwise be concealed.

Suspended Timber Floors

Within the Main House the existing suspended timber floors are proposed to be retained.

Rather than replacing these floors with modern solid construction, thermal upgrading will be achieved through insulation installed between the existing joists.

The existing ventilated sub-floor void will remain operational.

Air bricks and cross ventilation will be retained and maintained.

This approach preserves the existing floor construction whilst improving thermal performance and reducing energy demand.

The proposal therefore represents the minimum intervention necessary to improve the environmental performance of the building.

Condensation Risk Assessment Summary

To support the proposed amendments to the insulation strategy, condensation risk assessments have been undertaken by Kingspan Insulation Ltd in accordance with BS EN ISO 13788:2012 and BS 5250:2021. The assessments consider the proposed constructions under worst-case environmental conditions for a residential occupancy (Humidity Class 2) and evaluate the risk of interstitial condensation and long-term moisture accumulation.

1. Internal Wall Insulation

The proposed internal wall insulation to the existing external masonry walls achieves a calculated U-value of $0.18 \text{ W/m}^2\text{K}$. The Kingspan assessment identifies a small amount of seasonal condensation occurring at the interface between the retained air space and the existing stone wall during the colder months. The analysis predicts a peak moisture accumulation of 0.033 kg/m^2 during March, with the construction subsequently drying throughout the warmer months, resulting in no annual moisture accumulation (0.000 kg/m^2).

It should also be noted that the assessment has been undertaken using a 25mm unventilated air space. The proposed construction, however, incorporates a ventilated 25mm cavity, served by proprietary air sleeves through the external masonry, specifically to promote air movement behind the insulated lining and assist the dissipation of moisture. This additional ventilation provides a more robust moisture management strategy than that assumed within the calculation and is expected to further reduce the potential for condensation within the retained historic wall.

Accordingly, the proposed internal wall insulation system is considered to present no long-term condensation risk when installed in accordance with the proposed specification, including the provision of the ventilated cavity, proprietary variable vapour control layer and associated ventilation measures.

Existing Cavity Ventilation

During the detailed design process it has become apparent that the existing cottages incorporate a number of cavity ventilation grilles within both the front and rear elevations. These existing vents provide passive ventilation to the cavity behind the external stonework, assisting the movement of air and the natural dissipation of moisture within the wall construction.

The proposed insulation strategy has been developed to complement this existing moisture management approach by retaining a ventilated cavity behind the insulated timber stud lining. The introduction of proprietary air sleeves will maintain continuity of airflow within the cavity and promote ventilation behind the insulated lining, reducing the likelihood of moisture accumulation within the retained historic masonry. The presence of the existing ventilation grilles therefore provides additional confidence that the proposed construction will continue to facilitate the drying of the building fabric, consistent with the principles set out in BS 5250:2021 and Historic England's guidance on improving the energy efficiency of traditional buildings.

The retention and enhancement of passive cavity ventilation forms an integral part of the proposed thermal upgrade, ensuring that improvements in energy efficiency are achieved whilst maintaining the building's ability to manage moisture naturally and protecting the long-term condition of the historic fabric.

2. Pitched Roof

The proposed ventilated pitched roof construction achieves a calculated U-value of $0.17 \text{ W/m}^2\text{K}$. The assessment confirms that no interstitial condensation is predicted within the roof construction and that peak and annual moisture accumulation are both calculated as 0.000 kg/m^2 . The ventilated roof void and breathable membrane ensure that the temperature profile remains above the dew point throughout the construction. Accordingly, the proposed roof insulation strategy presents no predicted condensation risk and is considered suitable for the retention of the existing historic roof structure.

3. Suspended Timber Ground Floor

The proposed upgrade to the existing suspended timber floor, incorporating insulation between the existing timber joists, achieves a calculated U-value of $0.18 \text{ W/m}^2\text{K}$. The assessment predicts no interstitial condensation, with both peak and annual moisture accumulation calculated as 0.000 kg/m^2 . The analysis therefore concludes that the proposed floor insulation can be introduced without creating a long-term moisture risk within the existing suspended timber floor construction.

4. Main House Cavity Wall

The proposed cavity wall insulation to the later cavity wall construction achieves a calculated U-value of 0.16 W/m²K. The assessment predicts seasonal moisture accumulation at the interface between the retained air space and the existing limestone outer leaf, with a peak moisture content of 0.134 kg/m² occurring during April. The calculation also identifies a residual annual moisture accumulation of 0.089 kg/m². Whilst this indicates that some moisture may remain within the construction over an annual cycle, the predicted level of accumulation remains relatively low. As this element relates to a later cavity wall construction rather than the original solid stone fabric, the proposed insulated cavity wall is considered appropriate, subject to careful installation in accordance with the manufacturer's recommendations, including maintaining the specified residual cavity and ensuring appropriate control of air leakage and moisture ingress.

The condensation risk assessment for the proposed insulated cavity wall identifies a calculated annual residual moisture accumulation of 0.089 kg/m² at the interface between the retained air space and the existing limestone outer leaf. Kingspan Insulation Ltd has confirmed that this result should be assessed against the acceptance criteria contained within Table D.1 of BS 5250:2021 (Code of practice for the management of moisture in buildings). In accordance with this guidance, the predicted level of moisture accumulation is considered to be within the acceptable range and does not indicate a risk of harmful interstitial condensation or moisture-related deterioration of the construction. The assessment therefore demonstrates that the proposed cavity wall build-up provides an acceptable level of moisture performance when constructed in accordance with the approved specification, whilst achieving the required improvement in thermal performance.

As the residual moisture occurs within the newly constructed insulated cavity wall rather than the retained historic solid masonry, and the predicted performance satisfies the acceptance criteria set out in BS 5250:2021, the proposed construction is considered appropriate for use in this listed building and is not expected to have an adverse effect on the significance or long-term condition of the historic fabric.

Table D.1 — *Effect of condensate on impermeable surfaces*

Amount of condensate	Effect
g/m ²	
<30	A fine mist which does not run or drip
30–50	Droplets form and begin to run down vertical surfaces
51–250	Large droplets form and begin to run down sloping surfaces: • g/m² runs down a 45° slope; • g/m² runs down a 23° slope.
>250	Drops form and drip from horizontal surfaces

Overall Conclusion

The Kingspan condensation risk assessments demonstrate that the proposed thermal upgrades have been designed in accordance with recognised industry standards and provide a robust technical assessment of moisture behaviour within the proposed constructions. Three of the four assessed elements, the internal wall insulation, ventilated pitched roof and suspended timber floor show no long-term moisture accumulation, whilst the cavity wall assessment identifies only limited residual moisture within a modern cavity wall construction rather than the principal historic building fabric. Collectively, the assessments support the conclusion that the proposed insulation strategy provides a significant improvement in thermal performance whilst appropriately managing condensation risk and safeguarding the long-term condition of the retained historic structure.

13. Moisture Management Strategy

The principal concern identified during discussions with Conservation Planning relates to the management of moisture within the retained historic masonry.

The Applicant has therefore developed a comprehensive moisture management strategy informed by Historic England guidance and BS 5250:2021+A1:2022.

The strategy comprises:

- Independent internal wall construction
- Nominal residual cavity
- Proprietary variable vapour control membrane
- Dedicated service void
- Retained sub-floor ventilation
- Ventilated roof construction
- Continuous eaves and ridge ventilation
- Passive ventilation of the residual wall cavity by means of two proprietary air sleeves per external elevation serving each dwelling
- Detailed junction design to minimise cold bridging
- Manufacturer-supported condensation risk assessment

The proposed wall ventilation has been introduced directly in response to comments received from the Senior Conservation Officer suggesting that additional ventilation could form part of any justification supporting the variation of Condition 8.

The intention is to encourage drying of the retained masonry and reduce the potential for moisture accumulation behind the insulated lining.

Importantly, the proposed strategy should not be viewed as reliance upon any individual component.

Rather, moisture management is achieved through the interaction of the complete building element.

This approach reflects the philosophy adopted by BS 5250, which advocates assessment of moisture risk for the completed construction rather than consideration of individual materials in isolation.

A condensation risk assessment prepared by the insulation manufacturer will accompany this application to demonstrate the suitability of the proposed construction.

14. Conservation Benefits

Whilst the application seeks approval for modern construction materials in limited circumstances, the overall effect of the proposals is considered to produce several clear conservation benefits.

These include:

- Retention of the historic timber roof trusses as visible architectural features
- Avoidance of unnecessary intervention into existing masonry through independent wall construction
- Retention of existing suspended timber floors
- Reduced disturbance to historic fabric through the incorporation of dedicated service voids
- Improved long-term environmental performance supporting the continued occupation of the listed building
- A carefully considered moisture management strategy developed in consultation with Conservation Planning and Building Control

The proposed variations should therefore be viewed not as a departure from conservation principles but as a refined technical solution that better achieves the long-term preservation of the listed building while enabling its continued sustainable use as residential accommodation.

15. Historic England Guidance

The Applicant has carefully considered Historic England's published guidance throughout the development of the proposed construction strategy.

In particular, reference has been made to:

- Building Performance Advice Note 14 – Internal Wall Insulation
- Building Performance Advice Note 16 – Roof Insulation
- Energy Efficiency and Historic Buildings: Insulating Solid Walls
- Energy Efficiency and Historic Buildings: Insulating Pitched Roofs at Rafters
- Adapting Historic Buildings for Energy and Carbon Efficiency

These publications recognise that improving the thermal performance of historic buildings requires careful balancing of heritage conservation, moisture management, building performance and long-term sustainability.

Historic England acknowledges that internal insulation inevitably alters the hygrothermal behaviour of traditional buildings and that all forms of internal wall insulation require careful assessment.

Importantly, Historic England does not advocate a single construction solution for every listed building. Instead, its guidance promotes a building-specific approach that considers the significance of the historic fabric, the nature of the existing construction and the proposed future use.

Historic England also recognises that improving the energy efficiency of historic buildings should not be viewed as an objective in isolation but as part of a wider strategy that secures their long-term conservation and continued beneficial use.

The guidance encourages practitioners to:

- Understand the existing building before intervention
- Minimise unnecessary loss of historic fabric
- Adopt the least intrusive solution capable of achieving the required performance
- Carefully manage moisture movement through appropriate design and detailing
- Consider the behaviour of the complete building element rather than individual materials
- Ensure adequate ventilation where appropriate
- Monitor and manage moisture risks throughout the design process

The proposals submitted as part of this application have been developed in accordance with those principles.

Internal Wall Insulation

Historic England notes that internal wall insulation can increase moisture risk if poorly designed. However, the guidance also recognises that risks can be managed through appropriate assessment, detailing and ventilation.

The proposed wall construction has therefore been developed as an integrated system incorporating:

- Retained historic masonry
- An independent insulated lining
- A nominal residual cavity
- A proprietary variable vapour control membrane
- An independent service zone
- Passive ventilation to the residual cavity
- Manufacturer-supported condensation risk assessment

The proposed solution should therefore be considered as a complete moisture-management strategy rather than simply the introduction of PIR insulation.

Roof Construction

Historic England also encourages designers to retain significant historic roof structures wherever possible.

The existing timber trusses contribute positively to the architectural character and historic interest of the cottages.

A conventional ceiling-level insulation strategy would require these features to be concealed behind a new insulated ceiling.

The proposed ventilated rafter-level insulation allows the principal roof trusses to remain visible within each dwelling.

The proposal therefore secures a tangible heritage benefit by preserving one of the defining architectural characteristics of the building.

Existing Building Context

Historic England consistently advises that every historic building should be assessed individually.

Acre House Cottages and Main House are not a wholly traditional breathable structure.

The existing building already contains later interventions including:

- Concrete ground floors
- Concrete first floors

- Cavity wall construction
- Internal concrete blockwork
- Concrete Lintels

Accordingly, the proposed construction strategy has been developed specifically for this building rather than applying generic retrofit solutions intended for unaltered solid-wall buildings.

Long-Term Conservation

Historic England recognises that securing the continued beneficial use of a listed building is often the most effective means of ensuring its long-term preservation.

The approved conversion provides a sustainable future for Acre House Main House and Cottages.

The proposed variations do not alter that approved heritage strategy.

Instead, they refine the technical construction to better balance conservation, moisture management, energy efficiency and Building Regulations whilst preserving the significance of the listed building.

The Applicant therefore considers that the proposals fully accord with the principles promoted by Historic England for the sustainable adaptation of historic buildings.

16. BS 5250:2021+A1:2022 – Moisture Management

BS 5250:2021+A1:2022 represents the current British Standard for the management of moisture in buildings.

The Standard adopts a risk-based approach to moisture management and promotes assessment of the complete building element rather than reliance upon prescriptive rules relating to individual materials.

The proposed construction strategy has therefore been developed as an integrated building system comprising:

- Retained historic masonry
- Independent insulated wall lining
- Residual cavity
- Variable vapour control membrane
- Independent service zone
- Passive cavity ventilation
- Retained suspended floor ventilation
- Ventilated roof construction
- Continuous roof ventilation
- Carefully considered junction detailing

Each element contributes towards the overall moisture management strategy.

The Applicant acknowledges that no internal insulation system can entirely eliminate moisture risk.

However, the objective of good design is to understand, manage and minimise those risks through appropriate detailing and construction.

The proposed build-ups have been developed on that basis.

To further support the application, a condensation risk assessment prepared by the insulation manufacturer will be submitted demonstrating the suitability of the proposed constructions.

This follows the recommendations made by Kirklees Building Control during the design development process.

17. Heritage Impact Assessment

Section 16 of the Planning (Listed Buildings and Conservation Areas) Act 1990 requires special regard to be given to preserving listed buildings and their special architectural or historic interest.

The proposed variations have therefore been assessed against the significance of the heritage asset.

External Appearance

The proposed variations are entirely internal.

No changes are proposed to:

- External walls
- Roof coverings
- Windows
- Doors
- External architectural detailing
- The wider setting of the listed building

There is therefore no impact upon the external appearance or contribution of the building to the surrounding conservation context.

Historic Fabric

The proposals have been specifically designed to minimise intervention into the retained historic fabric.

The proposed independent wall lining avoids unnecessary chasing or direct fixing into historic masonry.

The existing suspended timber floors are retained.

The existing roof structure is retained.

The proposed construction therefore preserves substantially more historic fabric than many alternative approaches.

Architectural Character

One of the defining internal characteristics of the cottages is the substantial historic timber roof structure.

A conventional ceiling-level insulation strategy would require these trusses to be concealed behind new ceilings.

The proposed roof construction instead allows these significant structural elements to remain partially exposed within each dwelling.

This is considered to represent a positive heritage outcome.

Significance

The proposed concrete blockwork is confined entirely to new internal party walls required to achieve statutory acoustic separation between the approved residential dwellings and infill sections of external cavity walls where the blockwork will form the inner leaf.

The blockwork does not replace historic construction.

It remains entirely concealed following completion.

Its impact upon the significance of the listed building is therefore considered negligible.

Similarly, the proposed insulated wall lining has been designed to minimise intervention into the existing masonry whilst improving the long-term environmental performance of the building.

The proposals do not adversely affect those elements of the building that contribute most strongly to its special architectural and historic interest.

Overall, the proposals preserve the significance of the listed building.

18. Planning Balance

The proposed variations should be considered within the context of the approved conversion of the listed buildings into six residential dwellings.

The principle of that conversion has already been accepted through the grant of Listed Building Consent.

The current application does not seek to alter the approved use or design.

Instead, it seeks approval for revised construction methods developed during the detailed technical design stage.

The Applicant considers that the proposed variations provide a more balanced solution by:

- Improving the long-term environmental performance of the building
- Facilitating compliance with the Building Regulations
- Preserving significant historic structural elements
- Minimising intervention into historic masonry
- Retaining existing suspended timber floors
- Providing robust acoustic separation between dwellings
- Incorporating a comprehensive moisture management strategy
- Responding directly to advice received from Conservation Planning, Building Control and the independent Heritage Consultant

The proposals therefore secure the long-term sustainable use of the listed building whilst preserving its architectural and historic significance.

The Applicant considers that the revised proposals better satisfy the objectives of the Planning (Listed Buildings and Conservation Areas) Act 1990, the National Planning Policy Framework and Policies LP24 and LP35 of the Kirklees Local Plan than the currently approved construction.

19. Conclusion

This application seeks the variation of Conditions 8 and 9 attached to Listed Building Consent reference 2022/92776.

The proposed amendments have arisen following detailed technical design and extensive consultation with Kirklees Council Conservation Planning, Kirklees Building Control and an independent Planning and Heritage Consultant.

The proposals do not alter the approved layout, appearance or use of the listed building.

Instead, they refine the technical construction in order to provide an appropriate balance between heritage conservation, moisture management, Building Regulations compliance and the long-term occupation of the building.

The proposed use of concrete blockwork is limited to wholly new internal party walls where required to achieve recognised acoustic standards for separate dwellings and infill sections of external cavity walls where the blockwork will form the inner leaf and remains entirely concealed following completion.

The proposed insulation strategy has been developed as a complete building system incorporating independent wall linings, ventilated roof construction, retained suspended floors, passive cavity ventilation, variable vapour control membranes and carefully considered detailing intended to manage moisture in accordance with the principles contained within BS 5250.

Importantly, the revised roof construction allows the existing historic timber trusses to remain visible within each dwelling, preserving one of the defining architectural features of the building whilst delivering the thermal performance required for modern residential occupation.

Taken as a whole, the proposed variations preserve the special architectural and historic interest of the listed building, minimise intervention into the historic fabric and secure the long-term viable use of the heritage asset.

The Applicant therefore respectfully requests that Kirklees Council approve the variation of Conditions 8 and 9 of Listed Building Consent 2022/92776.

20. Proposed Replacement Condition Wording

The Applicant respectfully requests that Conditions 8 and 9 be varied and replaced with the following wording.

Proposed Condition 8

Thermal Upgrading and Moisture Management

The development shall be carried out in accordance with the approved thermal upgrade strategy, drawings and specifications submitted pursuant to this application.

The approved construction shall comprise only the insulation systems, vapour control measures, ventilation provisions and associated construction details identified on the approved drawings and supporting technical documentation.

Prior to commencement of the relevant works, a condensation risk assessment prepared by a suitably qualified specialist or the insulation manufacturer shall be submitted to and approved in writing by the Local Planning Authority. The assessment shall demonstrate that the proposed wall, floor and roof constructions have been designed having regard to the principles contained within BS 5250:2021+A1:2022 and shall include typical junction details where necessary to demonstrate the management of moisture, cold bridging and ventilation.

The development shall thereafter be completed in accordance with the approved details.

Reason: To preserve the significance of the Listed Building whilst ensuring that the approved thermal upgrade has been appropriately designed to manage moisture movement and protect the long-term condition of the retained historic fabric in accordance with Policies LP24 and LP35 of the Kirklees Local Plan, the Planning (Listed Buildings and Conservation Areas) Act 1990 and the National Planning Policy Framework.

Proposed Condition 9

New Wall Constructions

Notwithstanding the details previously approved, the use of concrete blockwork shall be permitted only within: (i) new internal separating walls between residential dwellings constructed in accordance with the approved Robust Detail E-WM-1 specification; (ii) replacement and infill cavity wall construction to the areas of the former link extension, tied into the retained historic building fabric; and (iii) new insulated cavity wall construction where new work abuts the retained solid masonry walls of the principal dwelling, all in accordance with the approved architectural drawings.

No other use of concrete or cementitious construction shall take place unless otherwise first approved in writing by the Local Planning Authority.

Reason: To preserve the special architectural and historic interest of the Listed Building whilst allowing the incorporation of a recognised acoustic separating wall construction necessary to satisfy the requirements of Approved Document E of the Building Regulations for the approved residential conversion.

Proposed Appendices

Appendix A – Proposed Ground Floor Insulation and Blockwork Wall - Cottages

Appendix B – Proposed First Floor Insulation and Blockwork Wall - Cottages

Appendix C – Proposed Elevations Cavity Ventilation Grille Locations - Cottages

Appendix D – Existing External Cavity Wall Drawing - Cottages

Appendix E – Existing Concrete Walls and Floors Drawing -Cottages

Appendix F – Proposed Main House Ground Floor Insulation and Blockwork Wall

Appendix G – Proposed Main House First Floor Insulation and Blockwork Wall

Appendix H – Robust Detail E-WM-1 Specification and Details

Appendix I – Kingspan Technical Data Sheets / Brochures

Appendix J – Kingspan U-Values Condensation Risk Analysis Reports

Appendix A

Proposed Ground Floor Insulation and Blockwork Wall

Drawing – 25D01-FBA-ZZ-XX-DR-A-3001-P01 – Issued Separately

Appendix B

Proposed First Floor Insulation and Blockwork Wall

Drawing – 25D01-FBA-ZZ-XX-DR-A-3002-P01 – Issued Separately

Appendix C

Proposed Elevations Cavity Ventilation Grille Locations

Drawing – 25D01-FBA-ZZ-XX-DR-A-3003-P01 – Issued Separately

Appendix D

Existing External Cavity Wall Drawing

Drawing – 25D01-FBA-ZZ-XX-DR-A-3004-P01 – Issued Separately

Appendix E

Existing Concrete Walls and Floors Drawing

Drawing – 25D01-FBA-ZZ-XX-DR-A-3005-P01 – Issued Separately

Appendix F

Proposed Main House Ground Floor Insulation and Blockwork Walls

Drawing – 25D01-FBA-ZZ-XX-DR-A-3015-P01 – Issued Separately

Appendix G

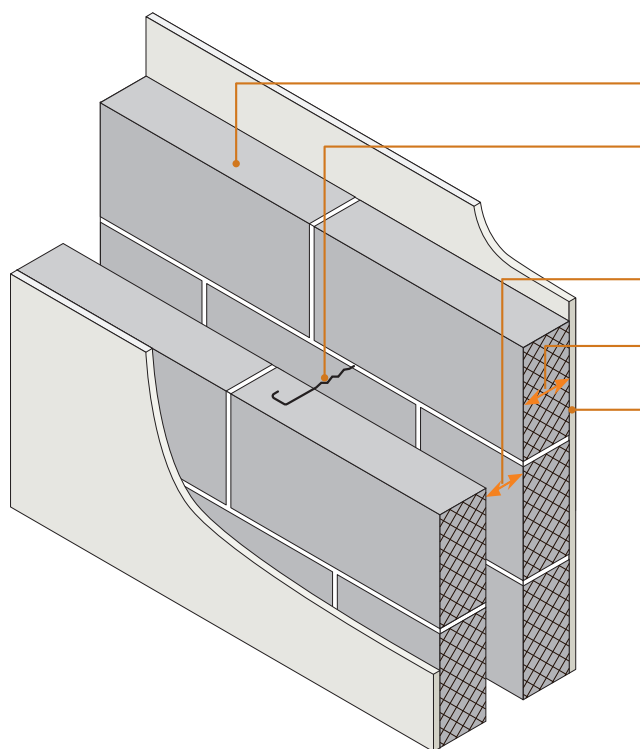
Proposed Main House First Floor Insulation and Blockwork Walls

Drawing – 25D01-FBA-ZZ-XX-DR-A-3016-P01 – Issued Separately

Appendix H

Robust Detail E-WM-1 Specification and Details

Dense aggregate blocks ■
Wet plaster ■



Block density	1850 to 2300 kg/m ³
Wall ties	Approved Document E "Tie type A" (see Appendix A)
Cavity width	75mm (min)
Block thickness	100mm (min), each leaf
Wall finish	13mm plaster or cement: sand render with plaster skim (min 10 kg/m ²), both sides
External (flanking) wall	Masonry (both leaves) with 50mm (min) cavity – clear, fully filled or partially filled with insulation

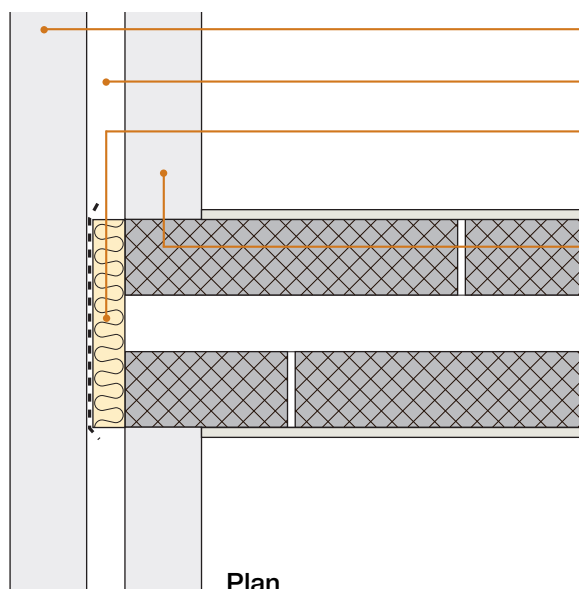
Separating wall cavity insulation (optional)

The cavity may be insulated with mineral wool with a maximum density of 40 kg/m³.

DO

- Keep cavity and wall ties (and insulation) free from mortar droppings and debris
- Fully fill all blockwork joints with mortar
- Make sure there is no connection between the two leaves except for wall ties and foundation (and insulation)
- Ensure that only solid blocks (i.e. not hollow or cellular) are used in the construction of separating and flanking walls
- Keep any chases for services to a minimum and fill well with mortar. Stagger chases on each side of the wall to avoid them being back to back
- Select an alternative Robust Detail where flues are required in the separating wall e.g. for dense aggregate blocks, see E-WM-3
- Refer to Appendix A

1. External (flanking) wall junction



Masonry outer leaf

External wall cavity (min 50mm)

Close external wall cavity with a flexible cavity stop. (Optional if external wall cavity is fully filled with built in mineral wool insulation)

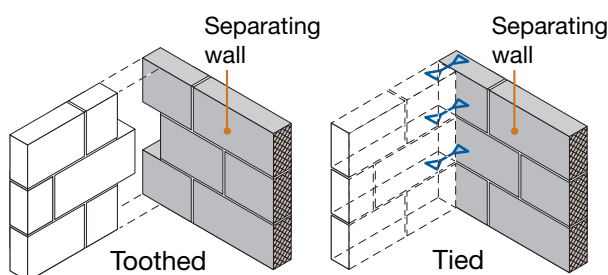
Inner leaf where there is no separating floor e.g. for houses

- 100mm (min) concrete block (1350 kg/m³ to 1600 kg/m³ or 1850 kg/m³ to 2300 kg/m³) or aircrete block (450 kg/m³ to 800 kg/m³)
- Internal finish - 13mm plaster or nominal 8 kg/m² gypsum-based board

Inner leaf where there is a separating floor e.g. for flats/apartments

- If using **robustdetails**® for floor, refer to Table 3a in introduction to select an acceptable **robustdetails**® separating floor. Then refer to separating floor Robust Detail to identify acceptable inner leaf construction
- If using floor requiring pre-completion testing, seek specialist advice

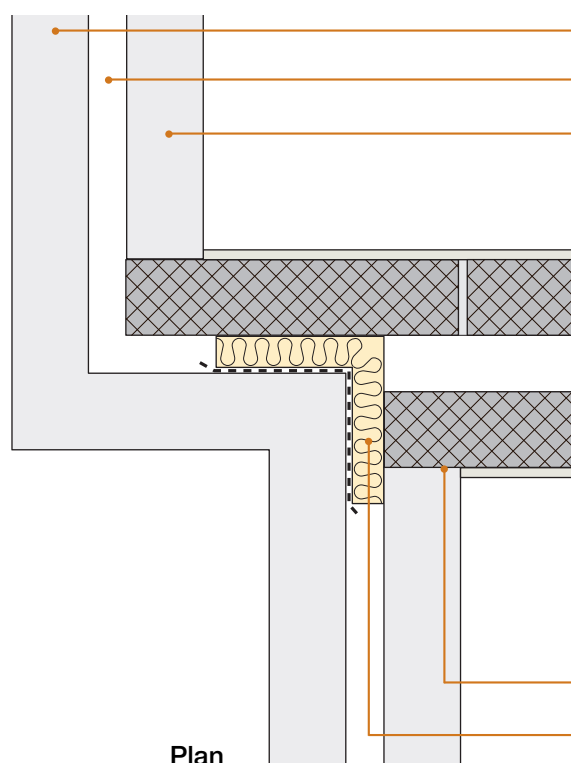
Tooth or tie walls together



Toothed

Tied

2. Staggered external (flanking) wall junction



Masonry outer leaf

External wall cavity (min 50mm)

Inner leaf where there is no separating floor e.g. for houses

- 100mm (min) concrete block (1350 kg/m³ to 1600 kg/m³, 1850 kg/m³ to 2300 kg/m³) or aircrete block (450 kg/m³ to 800 kg/m³)
- Internal finish - 13mm plaster or nominal 8 kg/m² gypsum-based board

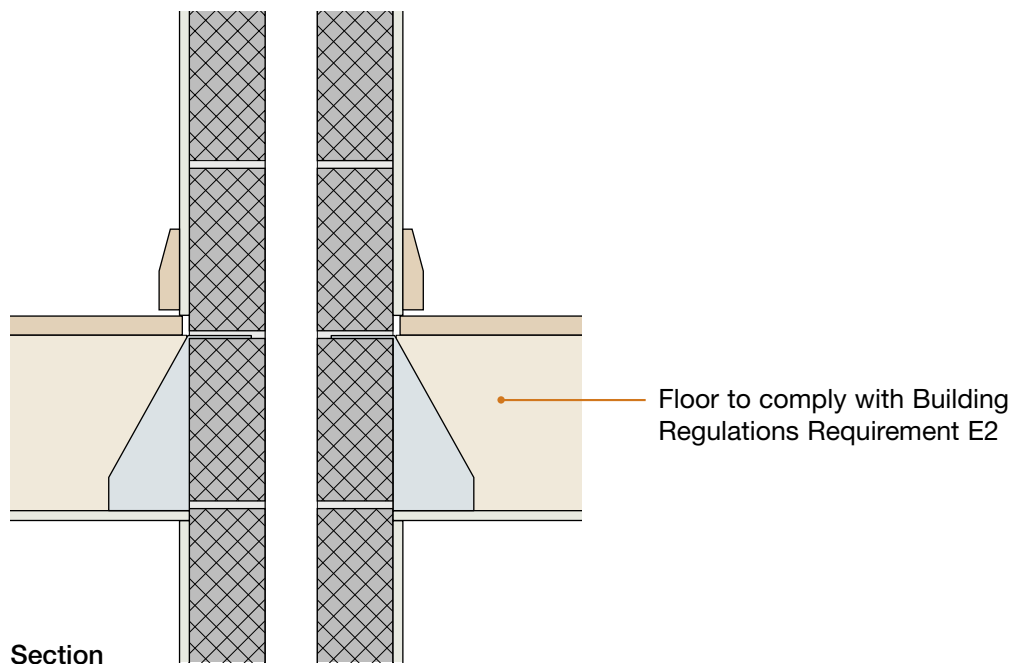
Inner leaf where there is a separating floor e.g. for flats/apartments

- If using **robustdetails**® for floor, refer to Table 3a in introduction to select an acceptable **robustdetails**® separating floor. Then refer to separating floor Robust Detail to identify acceptable inner leaf construction
- If using floor requiring pre-completion testing, seek specialist advice

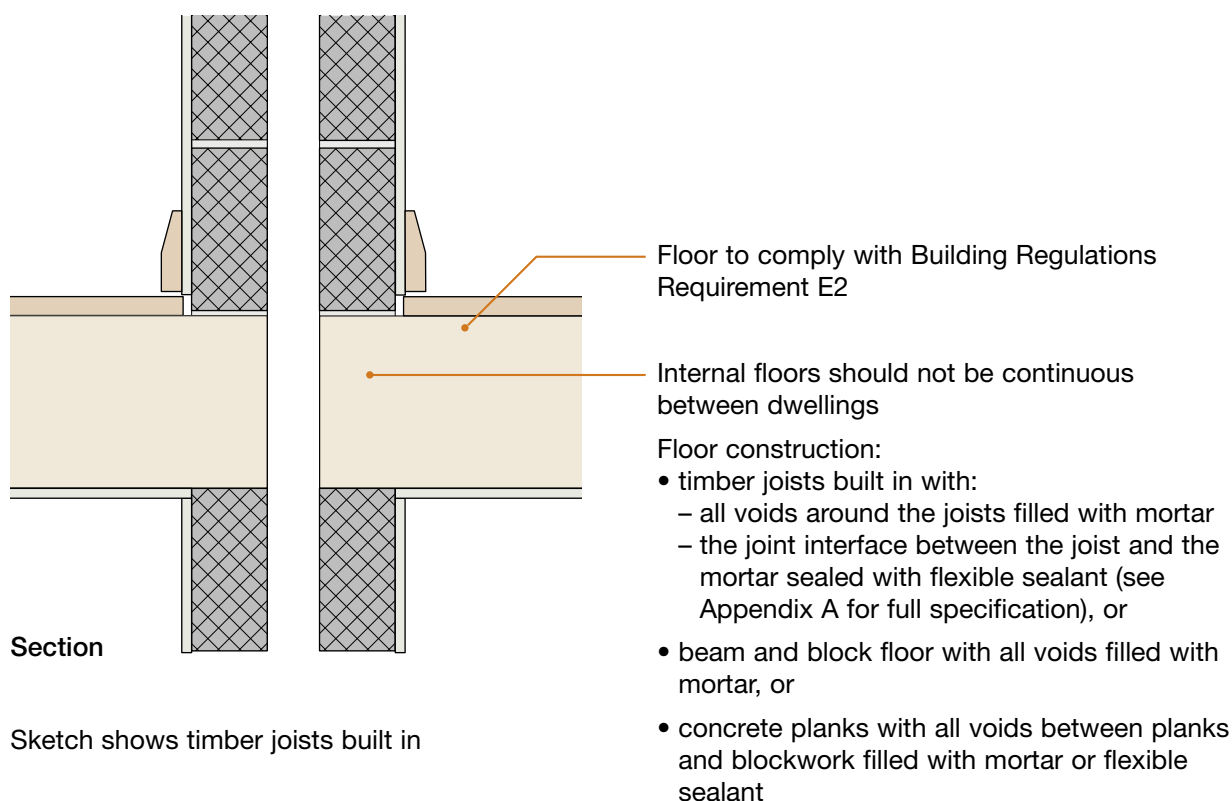
Tooth or tie walls together

Close external wall cavity with a flexible cavity stop. (Optional if external wall cavity is fully filled with built in mineral wool insulation)

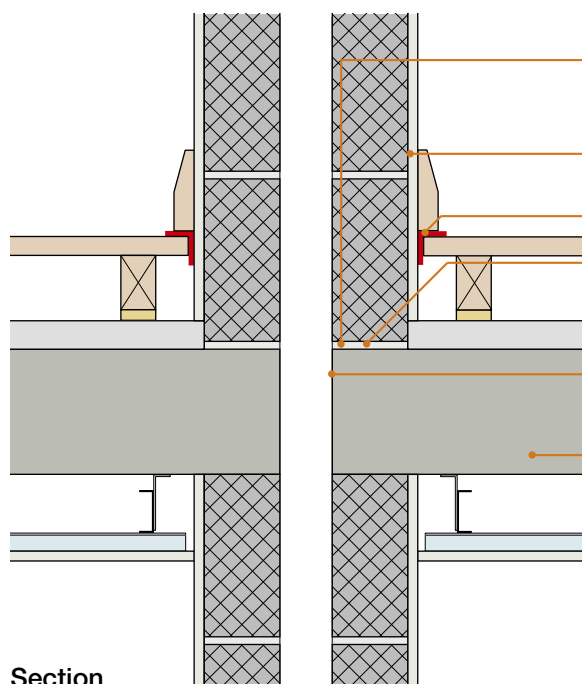
3. Internal floor junction: timber floor supported on joist hangers



4. Internal floor junction: timber floor joists built in, beam and block or precast concrete



5. Separating floor junction



Section

Sketch shows E-FC-1 type separating floor, FFT1 type floating floor treatment and CT3 type ceiling

Separating wall must not be continuous between storeys

Plaster complete wall surface

5mm (min) resilient flanking strip

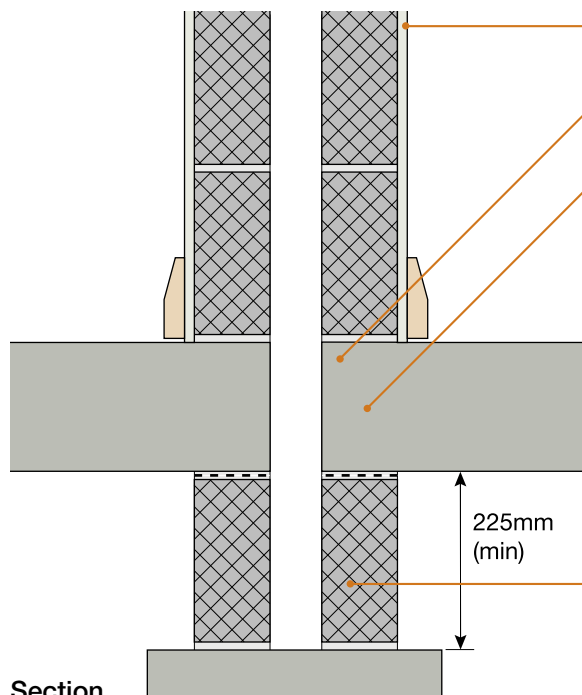
Concrete planks with all voids filled between planks and blockwork filled with mortar or flexible sealant

Separating floor must not be continuous between dwellings

Separating floor:

- if using **robust**details® for floor, refer to Table 3a in introduction and see separating floor Robust Detail for floating floor and ceiling options
- if using floor requiring pre-completion testing, seek specialist advice

6. Ground floor junction: timber floor, beam and block, precast concrete plank, cast in-situ concrete slab or ground bearing slab



Section

Plaster complete wall surface down to finished floor level

Ground floor not continuous between dwellings

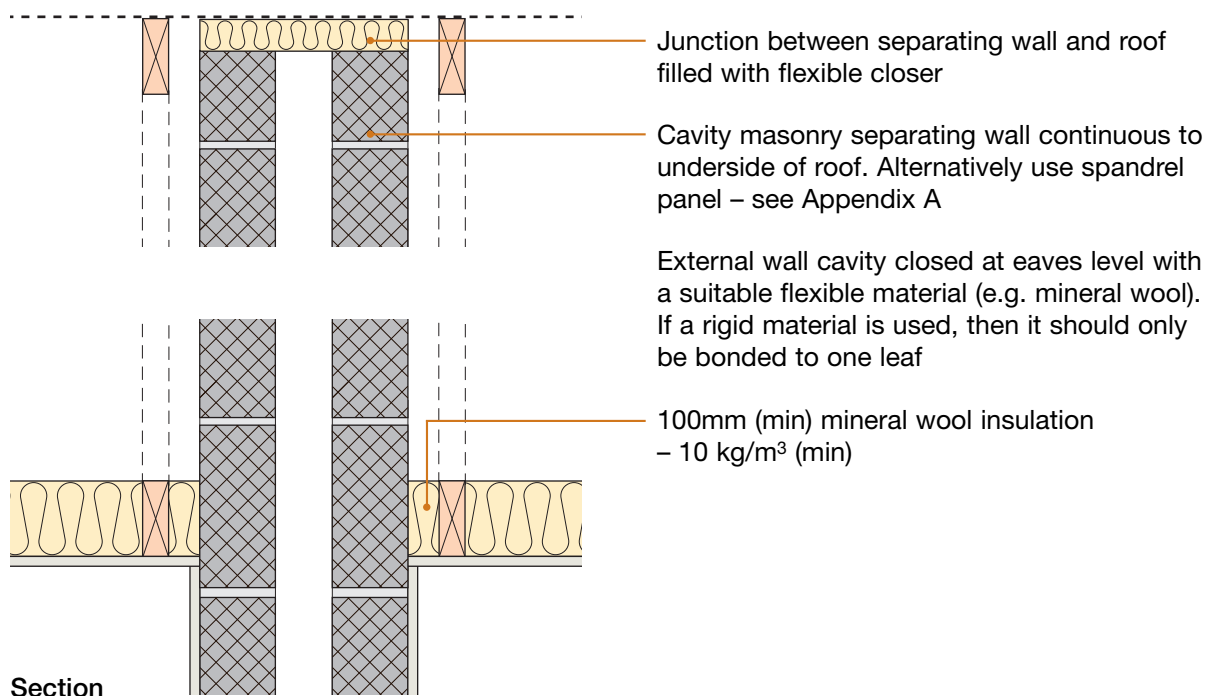
Ground floor construction:

- timber joists built in with:
 - all voids around the joists filled with mortar
 - the joint interface between the joist and the mortar sealed with flexible sealant (see Appendix A for full specification), or
- beam and block floor with all voids filled with mortar, or
- concrete planks with all voids between planks and blockwork filled with mortar or flexible sealant, or
- ground bearing slab

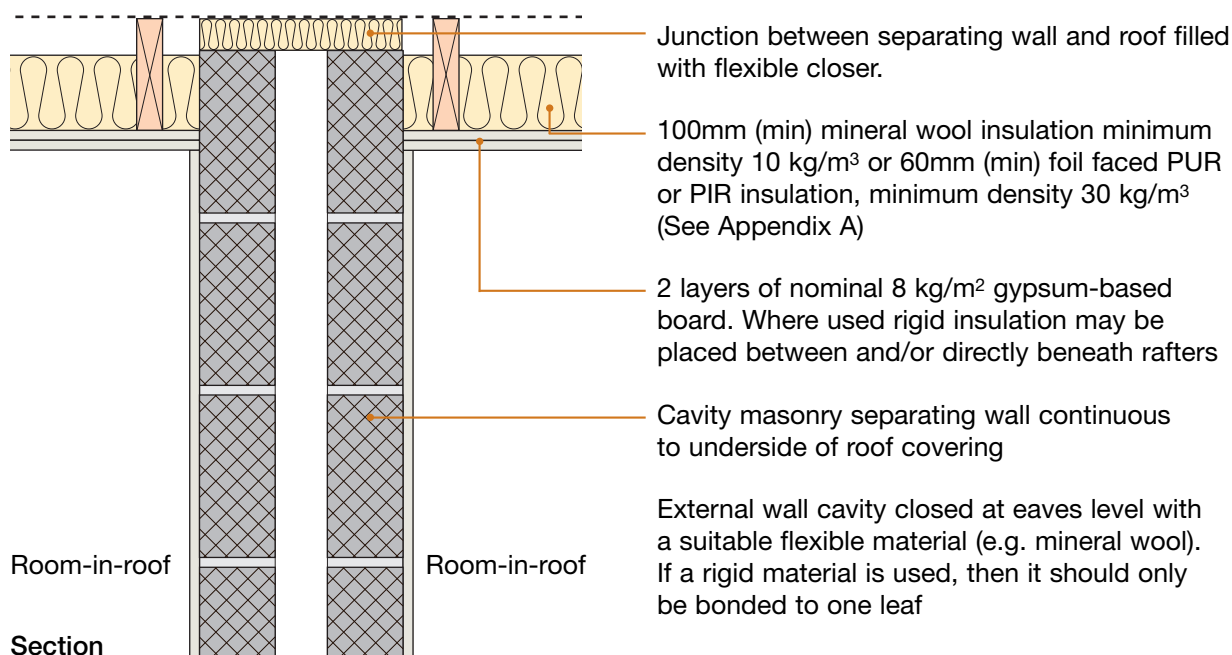
Cavity separating wall continuous to foundation, cavity fill may be provided below minimum clear cavity indicated. Solid walls which support separating walls are only acceptable where each ground floor (not timber joists) is built into one side of the separating wall and breaks the vertical continuity of the wall and the minimum clear cavity indicated is maintained.

Alternatively if using continuous raft foundation, refer to Appendix A2.

7. Roof junction – pitched roof without room-in-roof



8. Roof junction – pitched roof with room-in-roof



CHECKLIST (to be completed by site manager/supervisor)

Company: _____

Site: _____

Plot: _____ Site manager/supervisor: _____

Ref.	Item	Yes (✓)	No (✓)	Inspected (initials & date)
1.	Is separating wall cavity at least 75mm?	☐	☐	
2.	Is external (flanking) wall cavity at least 50mm?	☐	☐	
3.	Are separating wall blocks dense aggregate (1850 to 2300 kg/m ³)?	☐	☐	
4.	Is cavity free from droppings and debris?	☐	☐	
5.	Are separating wall ties Approved Document E “Tie type A” (see Appendix A)?	☐	☐	
6.	Are cavity stops installed?	☐	☐	
7.	Are joints fully filled?	☐	☐	
8.	Are voids around floor joists, chases, etc. fully filled/sealed?	☐	☐	
9.	Where there is a separating floor (e.g. flats/apartments) has the resilient flanking strip been installed?	☐	☐	
10.	Is separating wall satisfactorily complete?	☐	☐	

Notes (include details of any corrective action)

Site manager/supervisor signature

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Appendix I

Kingspan Technical Data Sheets / Brochures

Kingspan Data Sheets / Brochures – Issued Separately

Appendix J

Kingspan U-Values Condensation Risk Analysis Reports

U-Value Calculation and Condensation Risk Assessment

Project Information

Acre House, Acre Street, Lindley, Huddersfield, West Yorkshire

Construction: Cavity wall - partial fill, 2.5 per m², cavity 126mm - 225mm

Construction Type: Wall

File reference: 1-JS-260714-135659-171

Calculated U-value = **0.16W/m²K**

Selected Build-Up

Description	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m ² K/W)	Thermal Bridging	Vapour Resistivity (MN/gm)	Vapour Resistance (MN/g)	
Inside Surface			0.130				
PLASTERBOARD	12.5	0.190	0.066		50.000	0.625	
PLASTER DABS CAVITY. 	15.0		0.150	20.0% Plaster dabs, 100.0 centres		0.050	
BLOCKWORK 1400 Kg/m ³ (k-value = 0.51 W/mK) 	140.0	0.510	0.275	6.6% Mortar, 450.0 centres	45.000	6.300	 1
KOOLTHERM K108 	100.0	0.019	5.263			37.700	
UNV. A/SPACE;	50.0		0.664			0.050	
LIMESTONE (Hard) 	150.0	1.700	0.088	6.6% Mortar, 450.0 centres	400.000	60.000	
Outside Surface			0.040				

Key  Bridged and fastened  Bridged  Fastened

Supporting Information

1. GENERIC SPECIFIED BLOCK WEIGHT

Product Details

For further information on the specified products e.g. literature or specification clauses, please follow the links below or scan the QR code to the right:

Kingspan Kooltherm K108 Cavity Board
www.kingspaninsulation.co.uk/k108



Detailed U-value

The calculation method is in accordance with BS EN ISO 6946:2017 / I.S. EN ISO 6946:2017. A simplified summary of the steps involved are shown below

$$R_{total}(R_{tot}) = R_{si} + R_1 + R_2 + \dots + R_n + R_{se}$$

For a construction containing inhomogeneous layers the upper and lower resistances of the construction must be used

$$R_{tot;upper} = 1 / ((f_a / R_{tot;a}) + (f_b / R_{tot;b}) + \dots + (f_q / R_{tot;q}))$$

$$R_j = 1 / ((f_a / R_{aj}) + (f_b / R_{bj}) + \dots + (f_q / R_{qj}))$$

$$R_{tot;lower} = R_{si} + R_1 + R_2 + R_j + \dots + R_n + R_{se}$$

$$R_{tot} = (R_{tot;upper} + R_{tot;lower}) / 2$$

$$= (6.676 + 6.624) / 2$$

$$U = 1 / R_{tot}$$

$$= 6.650$$

$$\Delta U = \Delta U_g + \Delta U_f + \Delta U_r$$

ΔU_g correction for air voids - 0.0000

ΔU_f correction for fasteners by approximate procedure - 0.0049

(Fastener 1 : alpha 0.80 | fasteners per m² 2.500 | fasteners cross sectional area 23.400 mm² | thermal conductivity of fasteners 17.00 W/mK)

ΔU_f correction for fasteners by detailed calculation method (rainscreen cladding) – 0.0000
(point thermal transmittance 0.000 W/K | fasteners per m² 0.000)

ΔU_r correction for inverted roofs – 0.0000
(precipitation 0.000 mm/day | f • x 0.0000)

Total U-value (U_c) = $U + \Delta U$

If ΔU is less than 3% of U then the corrections need not be applied.

Calculations including a steel frame construction are calculated in accordance with BRE Digest 465.

Condensation

Condensation calculations have been performed in accordance with BS EN ISO 13788:2012 and BS 5250:2021 and the risk assessed within environmental conditions with the following characteristics

Humidity class 2 - Offices, shops and dwellings with low occupancy

Location: 2 England E & NE

Condensation risk has been assessed up to and including Level 2 Humidity Class (2 - Offices, shops and dwellings with low occupancy) within worst case environment conditions. The risk level is 1 in 20 years

Condensation has been calculated to accumulate at the followings interfaces:

Interface1: UNV. A/SPACE; / LIMESTONE (Hard)

Condensation Analysis

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Internal Temperature (°C)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Internal Relative Humidity (%)	51.6	51.1	51.3	52.9	56.5	61.9	66.1	66.9	63.1	58.8	53.5	52.3
External Temperature (°C)	1.2	1.3	3.4	5.5	8.8	11.9	13.8	13.7	11.6	8.3	4.0	1.9
External Relative Humidity (%)	90.0	88.0	83.5	82.5	81.0	81.0	81.0	82.5	84.0	87.5	88.5	90.5
Interface1 (Gc (kg/m²))	0.028	0.023	0.018	0.011	0.000	-0.010	-0.017	-0.014	-0.005	0.009	0.020	0.026
Interface1 (Ma (kg/m²))	0.083	0.106	0.124	0.134	0.134	0.124	0.108	0.094	0.089	0.009	0.028	0.055

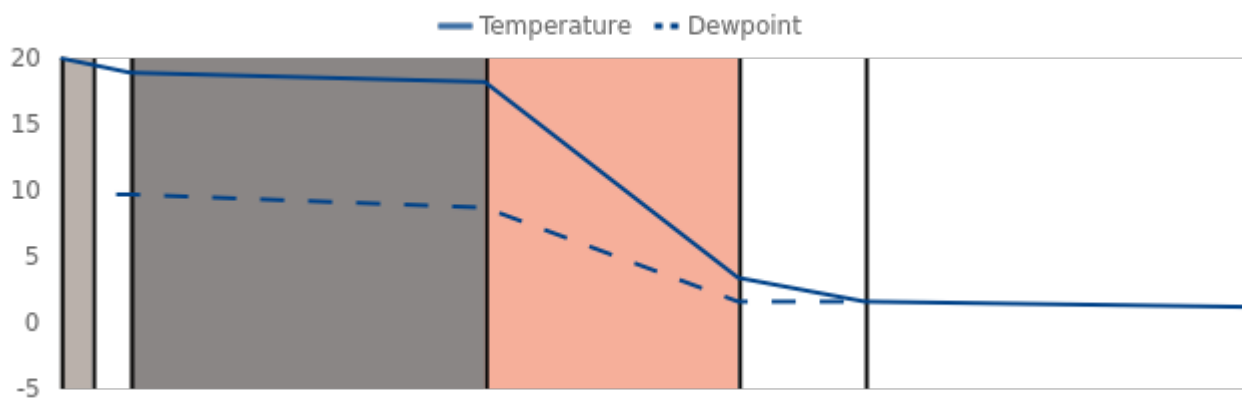
Gc = Monthly moisture accumulation per area at an interface

Ma = Accumulated moisture content per area at an interface

Peak accumulated moisture content per area at interface1 (Ma) = 0.134m Kg/m²

Annual moisture accumulation (Ma) = 0.089 Kg/m²

Peak moisture build-up month: April



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U-Value Calculation and Condensation Risk Assessment

Project Information

Acre House, Acre Street, Lindley, Huddersfield, West Yorkshire

Construction: Internal Wall Insulation- Timber Frame Wall

Construction Type: Wall

File reference: 1-JS-260714-140600-178

Calculated U-value = $0.18W/m^2K$

Selected Build-Up

Description	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m ² K/W)	Thermal Bridging	Vapour Resistivity (MN/gm)	Vapour Resistance (MN/g)	
Inside Surface			0.130				
PLASTER SKIM	3.0	0.180	0.017		60.000	0.180	
KOOLTHERM K118 37.5mm (12.5mm plasterboard internal finish)	37.5		1.382			94.700	 1
TIMBER STUD/JOIST/RAFTER CAVITY; U/V.	25.0		0.620	15% wall timber - timber frame		0.050	 2
KOOLTHERM K112	75.0	0.019	3.449	15% wall timber - timber frame		22.900	 3
UNV. A/SPACE;	25.0		0.476			0.050	 4
BRICKWORK (Inner Leaf)	102.5	0.560	0.183	6.6% Mortar, 450.0 centres	50.000	5.125	 5
UNV. A/SPACE;	100.0		0.183			0.050	 6
LIMESTONE (Hard)	200.0	1.700	0.126	6.6% Mortar, 450.0 centres	400.000	80.000	 7
Outside Surface			0.040				

Key  Bridged and fastened  Bridged  Fastened

Supporting Information

Calculation Notes: Customer specified build up

1. FIXED IN A CONTINUOUS LAYER
2. SPECIFIED SERVICE ZONE
3. BETWEEN TIMBER STUDS
4. 25mm AIR SPACE
5. EXISTING
6. EXISTING
7. EXISTING

Product Details

For further information on the specified products e.g. literature or specification clauses, please follow the links below or scan the QR code to the right:

Kingspan Kooltherm K118 Insulated Plasterboard
www.kingspaninsulation.co.uk/k118

Kingspan Kooltherm K112 Framing Board
www.kingspaninsulation.co.uk/k112



Detailed U-value

The calculation method is in accordance with BS EN ISO 6946:2017 / I.S. EN ISO 6946:2017. A simplified summary of the steps involved are shown below

$$R_{total}(R_{tot}) = R_{si} + R_1 + R_2 + \dots + R_n + R_{se}$$

For a construction containing inhomogeneous layers the upper and lower resistances of the construction must be used

$$R_{tot;upper} = 1 / ((f_a / R_{tot;a}) + (f_b / R_{tot;b}) + \dots + (f_q / R_{tot;q}))$$

$$R_j = 1 / ((f_a / R_{aj}) + (f_b / R_{bj}) + \dots + (f_q / R_{qj}))$$

$$R_{tot;lower} = R_{si} + R_1 + R_2 + R_j + \dots + R_n + R_{se}$$

$$R_{tot} = (R_{tot;upper} + R_{tot;lower}) / 2$$

$$= (6.137 + 5.243) / 2$$

$$U = 1 / R_{tot}$$

$$= 5.690$$

$$\Delta U = \Delta U_g + \Delta U_f + \Delta U_r$$

ΔU_g correction for air voids - 0.0000

ΔU_f correction for fasteners by approximate procedure - 0.0026

(Fastener 1 : alpha 0.80 | fasteners per m² 16.700 | fasteners cross sectional area 4.000 mm² | thermal conductivity of fasteners 50.00 W/mK)

ΔU_f correction for fasteners by detailed calculation method (rainscreen cladding) – 0.0000
(point thermal transmittance 0.000 W/K | fasteners per m² 0.000)

ΔU_r correction for inverted roofs – 0.0000
(precipitation 0.000 mm/day | f • x 0.0000)

Total U-value (U_c) = $U + \Delta U$

If ΔU is less than 3% of U then the corrections need not be applied.

Calculations including a steel frame construction are calculated in accordance with BRE Digest 465.

Condensation

Condensation calculations have been performed in accordance with BS EN ISO 13788:2012 and BS 5250:2021 and the risk assessed within environmental conditions with the following characteristics

Humidity class 2 - Offices, shops and dwellings with low occupancy

Location: 2 England E & NE

Condensation risk has been assessed up to and including Level 2 Humidity Class (2 - Offices, shops and dwellings with low occupancy) within worst case environment conditions. The risk level is 1 in 20 years

Condensation has been calculated to accumulate at the followings interfaces:

Interface1: UNV. A/SPACE; / LIMESTONE (Hard)

Condensation Analysis

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Internal Temperature (°C)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Internal Relative Humidity (%)	51.6	51.1	51.3	52.9	56.5	61.9	66.1	66.9	63.1	58.8	53.5	52.3
External Temperature (°C)	1.2	1.3	3.4	5.5	8.8	11.9	13.8	13.7	11.6	8.3	4.0	1.9
External Relative Humidity (%)	90.0	88.0	83.5	82.5	81.0	81.0	81.0	82.5	84.0	87.5	88.5	90.5
Interface1 (Gc (kg/m²))	0.008	0.007	0.004	0.001	-0.004	-0.008	-0.012	-0.010	0.000	0.000	0.005	0.008
Interface1 (Ma (kg/m²))	0.022	0.029	0.033	0.033	0.029	0.021	0.009	0.000	0.000	0.000	0.006	0.014

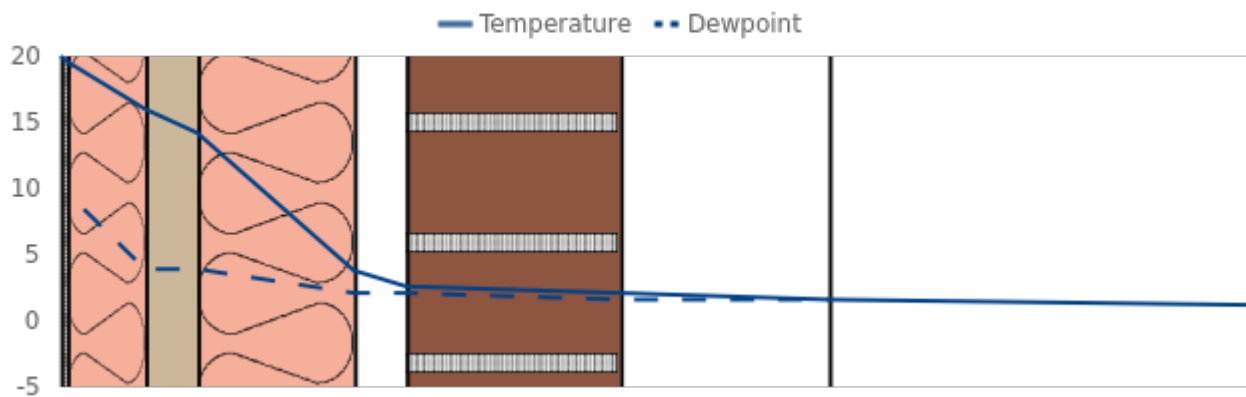
Gc = Monthly moisture accumulation per area at an interface

Ma = Accumulated moisture content per area at an interface

Peak accumulated moisture content per area at interface1 (Ma) = 0.033m Kg/m²

Annual moisture accumulation (Ma) = 0.000 Kg/m²

Peak moisture build-up month: March



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U-Value Calculation and Condensation Risk Assessment

Project Information Acre House, Acre Street, Lindley, Huddersfield, West Yorkshire

Construction: Pitched roof – Ventilated

Construction Type: Pitched Roof

File reference: 1-JS-260714-141301-180

Calculated U-value = $0.17W/m^2K$

Selected Build-Up

Description	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m²K/W)	Thermal Bridging	Vapour Resistivity (MN/gm)	Vapour Resistance (MN/g)	
Inside Surface			0.100				
PLASTER SKIM	3.0	0.180	0.017		60.000	0.180	
KOOLTHERM K118 37.5mm (12.5mm plasterboard internal finish) 	37.5		1.382			94.700	 1
KOOLTHERM K107 	120.0	0.019	5.628	12.7% roof timber - 47mm @ 400mm ctrs + 1% for noggins + loft hatches		37.700	 2
VENTILATED RAFTER/JOIST CAVITY	55.0		0.000			0.000	
KINGSPAN NILVENT.17 BREATHABLE MEMBRANE	0.5		0.000			0.100	
TILES / SLATES & BATTENS; VENTILATED PITCHED ROOF.	30.0		0.000			0.000	
Outside Surface			0.172				

Key  Bridged and fastened  Bridged  Fastened

Supporting Information

1. FIXED IN A CONTINUOUS LAYER
2. BETWEEN TIMBERS

Product Details

For further information on the specified products e.g. literature or specification clauses, please follow the links below or scan the QR code to the right:

Kingspan Kooltherm K118 Insulated Plasterboard
www.kingspaninsulation.co.uk/k118



Kingspan Kooltherm K107 Pitched Roof Board
www.kingspaninsulation.co.uk/k107



Kingspan nilvent

Detailed U-value

The calculation method is in accordance with BS EN ISO 6946:2017 / I.S. EN ISO 6946:2017. A simplified summary of the steps involved are shown below

$$R_{total}(R_{tot}) = R_{si} + R_1 + R_2 + \dots + R_n + R_{se}$$

For a construction containing inhomogeneous layers the upper and lower resistances of the construction must be used

$$R_{tot;upper} = 1 / ((f_a / R_{tot;a}) + (f_b / R_{tot;b}) + \dots + (f_q / R_{tot;q}))$$

$$R_j = 1 / ((f_a / R_{aj}) + (f_b / R_{bj}) + \dots + (f_q / R_{qj}))$$

$$R_{tot;lower} = R_{si} + R_1 + R_2 + R_j + \dots + R_n + R_{se}$$

$$R_{tot} = (R_{tot;upper} + R_{tot;lower}) / 2$$

$$= (6.313 + 5.290) / 2$$

$$U = 1 / R_{tot}$$

$$= 5.801$$

$$\Delta U = \Delta U_g + \Delta U_f + \Delta U_r$$

ΔU_g correction for air voids - 0.0000

ΔU_f correction for fasteners by approximate procedure - 0.0021

(Fastener 1 : alpha 0.80 | fasteners per m² 16.700 | fasteners cross sectional area 4.000 mm² | thermal conductivity of fasteners 50.00 W/mK)

ΔU_f correction for fasteners by detailed calculation method (rainscreen cladding) – 0.0000
(point thermal transmittance 0.000 W/K | fasteners per m² 0.000)

ΔU_r correction for inverted roofs – 0.0000
(precipitation 0.000 mm/day | f• x 0.0000)

Total U-value (U_c) = $U + \Delta U$

If ΔU is less than 3% of U then the corrections need not be applied.

Calculations including a steel frame construction are calculated in accordance with BRE Digest 465.

Condensation

Condensation calculations have been performed in accordance with BS EN ISO 13788:2012 and BS 5250:2021 and the risk assessed within environmental conditions with the following characteristics

Humidity class 2 - Offices, shops and dwellings with low occupancy

Location: 2 England E & NE

Condensation risk has been assessed up to and including Level 2 Humidity Class (2 - Offices, shops and dwellings with low occupancy) within worst case environment conditions. The risk level is 1 in 20 years

Condensation Analysis

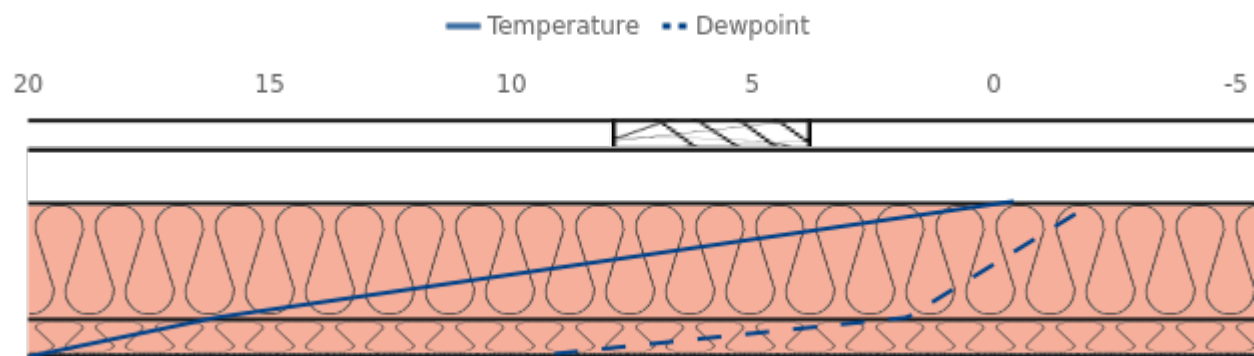
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Internal Temperature (°C)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Internal Relative Humidity (%)	49.4	49.1	49.9	51.0	53.8	58.2	61.7	62.4	59.2	55.8	51.8	50.8
External Temperature (°C)	-0.8	-0.7	1.4	3.5	6.8	9.9	11.8	11.7	9.6	6.3	2.0	-0.1
External Relative Humidity (%)	90.0	88.0	83.5	82.5	81.0	81.0	81.0	82.5	84.0	87.5	88.5	90.5

Gc = Monthly moisture accumulation per area at an interface

Ma = Accumulated moisture content per area at an interface

Peak accumulated moisture content per area at all interfaces (Ma) = 0.000 Kg/m²

Annual moisture accumulation (Ma) = 0.000 Kg/m²



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U-Value Calculation and Condensation Risk Assessment

Project Information

Acre House, Acre Street, Lindley, Huddersfield, West Yorkshire

Construction: Suspended ground floor - Insulation between timber joists

Construction Type: Suspended Floor

File reference: 1-JS-260714-145846-204

Calculated U-value = $0.18W/m^2K$

Selected Build-Up

Description	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m ² K/W)	Thermal Bridging	Vapour Resistivity (MNs/gm)	Vapour Resistance (MNs/g)	
Inside Surface			0.170				
CHIPBOARD	22.0	0.150	0.147		500.000	11.000	 1
KOOLTHERM K103 	120.0	0.019	5.608	13.1% floor timber - 47mm joists @ 400mm ctrs + 47mm noggins @ 3000mm ctrs, 400.0 centres	370.000	44.400	 2
Ground			0.187				

Key  Bridged and fastened  Bridged  Fastened

Supporting Information

Calculation Notes: Customer specified build up. Existing suspended floor, new insulation will be installed via access from below joists. There is no VCL/separation layer between the chipboard and joists.

1. EXISTING
2. EXISTING FLOOR JOISTS. INSULATION BETWEEN TIMBERS

Product Details

For further information on the specified products e.g. literature or specification clauses, please follow the links below or scan the QR code to the right:

Kingspan Kooltherm K103 Floorboard
www.kingspaninsulation.co.uk/k103



Detailed U-value

The calculation method is in accordance with BS EN ISO 6946:2017 / I.S. EN ISO 6946:2017. A simplified summary of the steps involved are shown below

$$R_{total}(R_{tot}) = R_{si} + R_1 + R_2 + \dots + R_n + R_{se}$$

For a construction containing inhomogeneous layers the upper and lower resistances of the construction must be used

$$R_{tot;upper} = 1 / ((f_a / R_{tot;a}) + (f_b / R_{tot;b}) + \dots + (f_q / R_{tot;q}))$$

$$R_j = 1 / ((f_a / R_{aj}) + (f_b / R_{bj}) + \dots + (f_q / R_{qj}))$$

$$R_{tot;lower} = R_{si} + R_1 + R_2 + R_j + \dots + R_n + R_{se}$$

$$R_{tot} = (R_{tot;upper} + R_{tot;lower}) / 2$$

$$= (4.558 + 4.078) / 2$$

$$U = 1 / R_{tot}$$

$$= 5.537$$

$$\Delta U = \Delta U_g + \Delta U_f + \Delta U_r$$

ΔU_g correction for air voids - 0.0000

ΔU_f correction for fasteners by approximate procedure - 0.0000

ΔU_f correction for fasteners by detailed calculation method (rainscreen cladding) – 0.0000
(point thermal transmittance 0.000 W/K | fasteners per m² 0.000)

ΔU_r correction for inverted roofs – 0.0000
(precipitation 0.000 mm/day | $f \bullet \times 0.0000$)

Total U-value (U_c) = $U + \Delta U$

If ΔU is less than 3% of U then the corrections need not be applied.

Calculations including a steel frame construction are calculated in accordance with BRE Digest 465.

Calculations for floor and basement constructions are calculated in accordance with BS EN ISO 13370:2017 / I.S. EN ISO 13370:2017.

Characteristics	Value	Characteristics	Value
Perimeter	71.100m	Area	238.500m ²
P/A	0.298	Soil type	Sand or Gravel
Earth conductivity	2.000W/mK	Floor height above ground	0.225m
Underfloor wall u-value	1.700W/m ² K	Ventilation openings	1500.000mm ² /m
Average wind speed	5.000m/s	Wind shielding factor	0.050

Condensation

Condensation calculations have been performed in accordance with BS EN ISO 13788:2012 and BS 5250:2021 and the risk assessed within environmental conditions with the following characteristics

Humidity class 2 - Offices, shops and dwellings with low occupancy

Location: 2 England E & NE

Condensation risk has been assessed up to and including Level 2 Humidity Class (2 - Offices, shops and dwellings with low occupancy) within worst case environment conditions. The risk level is 1 in 20 years

Condensation Analysis

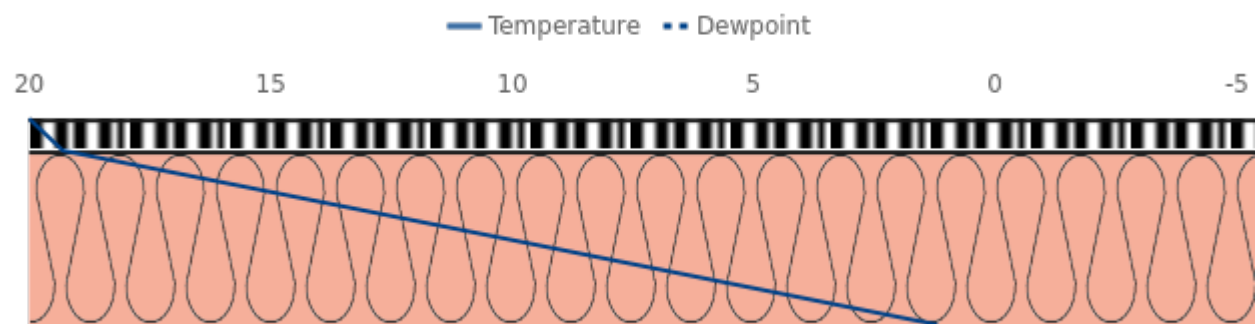
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Internal Temperature (°C)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Internal Relative Humidity (%)	51.6	51.1	51.3	52.9	56.5	61.9	66.1	66.9	63.1	58.8	53.5	52.3
External Temperature (°C)	1.2	1.3	3.4	5.5	8.8	11.9	13.8	13.7	11.6	8.3	4.0	1.9
External Relative Humidity (%)	90.0	88.0	83.5	82.5	81.0	81.0	81.0	82.5	84.0	87.5	88.5	90.5

Gc = Monthly moisture accumulation per area at an interface

Ma = Accumulated moisture content per area at an interface

Peak accumulated moisture content per area at all interfaces (Ma) = 0.000 Kg/m²

Annual moisture accumulation (Ma) = 0.000 Kg/m²



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