TIMBER FRAME HOUSING SOLUTIONS

Complete range of acoustic and thermal insulation, airtightness and moisture management solutions for timber frame housing.

ISOVER
SAINT-GOBAIN

Introduction

The timber frame market continues to grow within the UK.

Key drivers behind this growth include a shortened build programme, decreased risk of delays, faster weathertight envelope, improved airtightness, as well as reductions to site waste and storage requirements. As with other off-site manufacturing techniques, timber frame construction also helps mitigate issues with on-site skills shortages.

Isover offers a wide range of insulation, airtightness and moisture management solutions which will enhance the performance of a timber frame building and improve the comfort and safety of those living in it.

Contents

Acoustic

Unwanted noise can travel within a building via airborne transmission or impact transmission. To optimise acoustic comfort for inhabitants, careful consideration is needed in the design stage to identify likely sources of internal noise and how these could transfer within the home and between adjoining properties.

Often this requires specifying building details which go above and beyond the minimum acoustic insulation requirements of the Building Regs (England and Wales - Part E 2003 & Scotland - Section 5). However this due diligence in terms of acoustic comfort will lead to the specification of wall and floor constructions which are better aligned to the needs of inhabitants, providing them with the flexibility to live life the way they want:

- Being noisy when they want without disturbing family or neighbours
- Enjoying peace and quiet to relax or work whilst those living in the house or next door carry on with their lives

Isover's specialist glass wool acoustic insulation is used extensively throughout the UK to improve the acoustic comfort of homeowners and their adjoining neighbours. When installed within appropriate building systems, it reduces airborne sound transmission through internal or separating walls and provides an effective way to reduce impact noise transmission through floors.

Thermal

Appropriate specification and installation of insulation will help keep buildings warm in winter and cool in summer, slowing heat transfer by convection, conduction and radiation. As well as delivering the savings on homeowners' energy bills, at a national level insulation is one of the most cost effective methods of cutting energy usage and helping to meet ambitious targets on carbon emissions.

Isover's specialist insulation ranges for walls, roofs and floors are designed to improve the thermal efficiency of the building, reduce energy usage and help ensure compliance with Building Regs (England & Wales Part L1A and Scotland - Section 6 – Energy.) This brochure details solutions which can help achieve a range of U-values. Further guidance is also available through our Technical Advice Centre (Tel: 0115 945 1143).

Airtightness & Moisture Management

Airtightness refers to the amount of air that can escape or enter a building uncontrolled through unwanted gaps, cracks, holes or draughts. When cold air blows in and warm air leaks out, it has a huge effect on the thermal performance of buildings and on the comfort of the inhabitants.

Moisture management is the ability to limit moisture accumulation in the structure of the building, both through preventing water vapour entering in the first place and by giving damp structural materials the opportunity to dry out. Failure to address moisture accumulation leads to long term damage to the building structure and mould growth that can have adverse effects on occupant health.

The Vario® XtraSafe system was developed by Isover to be one of the most advanced airtightness and moisture management systems currently on the market. It provides a whole house airtightness solution to improve overall thermal performance and exceed the requirements of Building Regulations Part L1A.** The Vario® XtraSafe system will help prevent unintended air exchanges, keeping warm air in and cold air out. Correctly installed, Vario® XtraSafe can also help meet Passivhaus standards relating to air changes per hour i.e. ≤ 0.6 @ n50.

Vario® XtraSafe's 'smart vapour control layer' adapts to external conditions to provide the best possible protection for the structure. Its highly variable Sd value offers the best possible moisture control, whatever the weather:

- When it's warm and moist inside (e.g. in winter), relative humidity in the wall or roof is low so the membrane's pores close up and keep the water vapour out of the structure.
- Conversely, in summer the relative humidity in the wall/roof becomes higher, so the pores open up to allow accumulated water vapour to flow out. This allows the structure to dry out, preventing timbers from rotting, mould growth and long-term damage to the building fabric.

Non Combustible

All unfaced Isover glass wool insulation is classed as 'non combustible' by UK building regulations and conforms to the Euroclass A1 fire rating.*

Our specialist cavity barrier products are designed to prevent the spread of fire and smoke within concealed cavities in the timber frame construction, providing up to 120 minutes of fire protection.

*Frame Façade Slab is a faced product which achieves an A2 rating.

**Part L 1A of the building regulations sets out a minimum standard for airtightness for new dwellings (to be tested via a "Blower Door Test") and requires properties to include airtightness measures to meet or achieve less than $10m^3/(m^2.hr)$@50Pa*

Building Regulations

The diagrams below detail the performance requirements stipulated by UK building regulations for thermal and acoustic applications in a new build property. For thermal performance, the limiting fabric parameters (minimum level of thermal performance) are stated. For acoustic applications, the performance level which will ensure compliance is detailed.

The Applications section of the brochure provides further details on how Isover insulation can help achieve compliance throughout the property.

Key

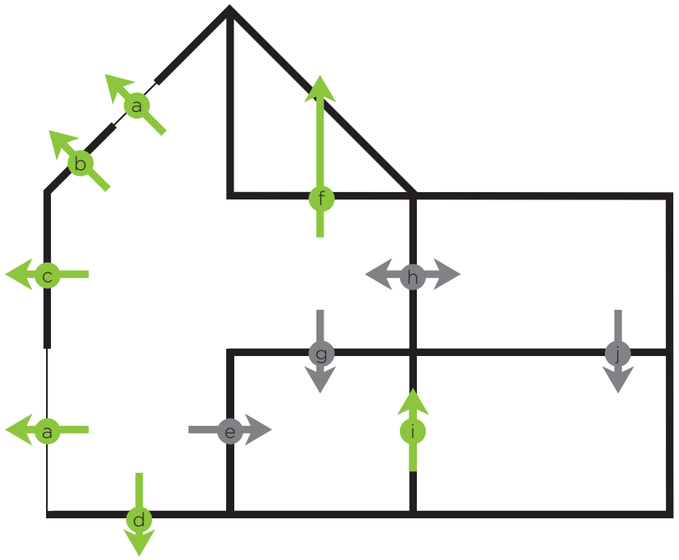
Acoustic (Airborne) dB
Internal - dB (Rw)
Separating - dB (DnTw + Ctr)

Thermal W/m²K

England, Scotland and Wales: Upper limit for air permeability is 10m³/(h.m²) at 50 Pa

England - New Dwellings - Part E & L

Minimum standards for U-values and Sound reduction



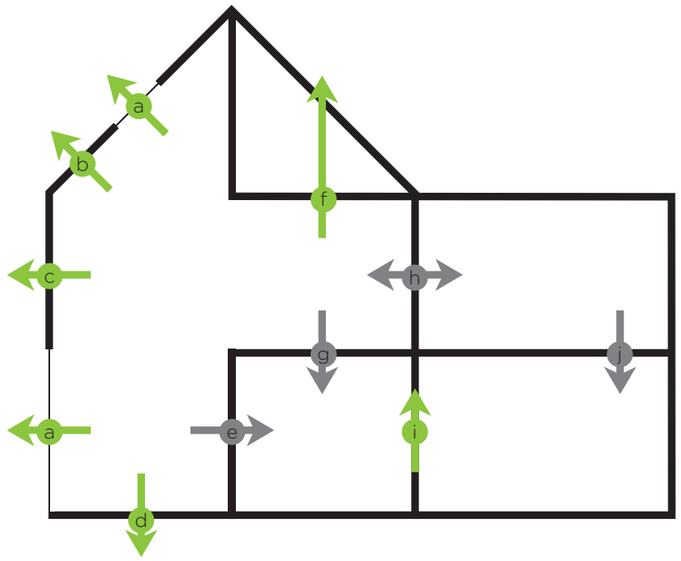
Minimum standards

- a **2.0** Doors and windows
- b **0.20** Pitched Roof - Rafter Level
- c **0.30** External walls
- d **0.25** Ground floors
- e **40** Internal walls
- f **0.20** Pitched Roof - joist level
- g **40** Internal floors
- h **45** Separating walls
- i **0.20** Separating walls
- j **45** (1) Separating floors

(1) Minimum impact sound insulation of 62 dB (LnTw) also required for separating floors.

Scotland - New Dwellings - Section 5 & 6

Minimum standards for U-values and Sound reduction



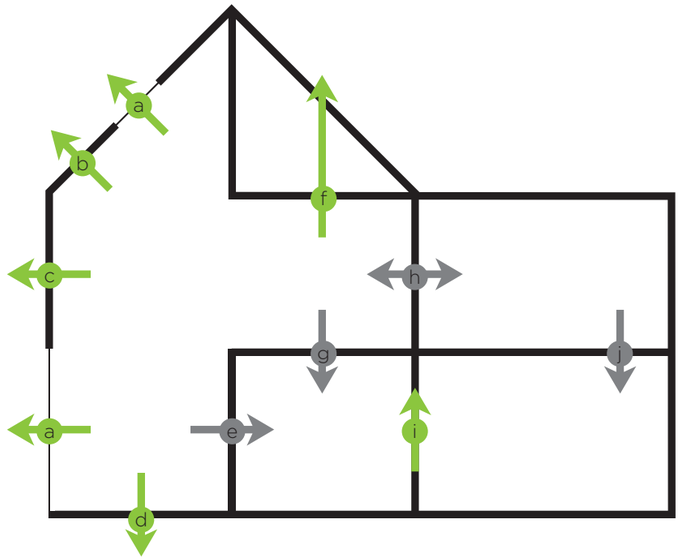
Minimum standards

- a **1.6** Doors and windows
- b **0.15** Pitched Roof - Rafter Level
- c **0.22** External walls
- d **0.18** Ground floors
- e **40** Internal walls
- f **0.15** Pitched Roof - joist level
- g **43** Internal floors
- h **56** Separating walls
- i **0.20** Separating walls
- j **56** (1) Separating floors

(1) Minimum impact sound insulation of 56 dB (LnTw) also required for separating floors.

Wales - New Dwellings - Part E & L

Minimum standards for U-values and Sound reduction

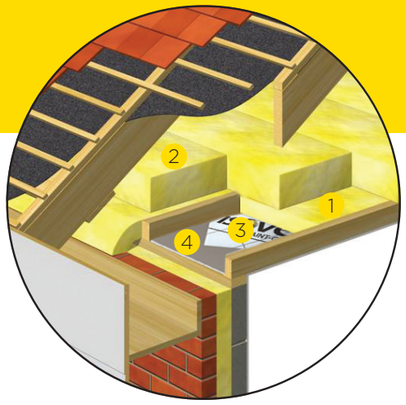


Minimum standards

- a **1.6** Doors and windows
- b **0.15** Pitched Roof - Rafter Level
- c **0.21** External walls
- d **0.18** Ground floors
- e **40** Internal walls
- f **0.15** Pitched Roof - joist level
- g **40** Internal floors
- h **45** Separating walls
- i **0.20** Separating walls
- j **45** (1) Separating floors

(1) Minimum impact sound insulation of 62 dB (LnTw) also required for separating floors.

Pitched Roof - Joist Level



Detail

1. Isover insulation between joists
2. Isover insulation cross laid over joists
3. Recommended: Isover Vario® XtraSafe Membrane System installed to the underside of truss to improve the airtightness of the fabric
4. 12.5mm Gyproc WallBoard

Thermal | **Airtightness & Moisture Management** | **Non combustible**

UK Building Regulations

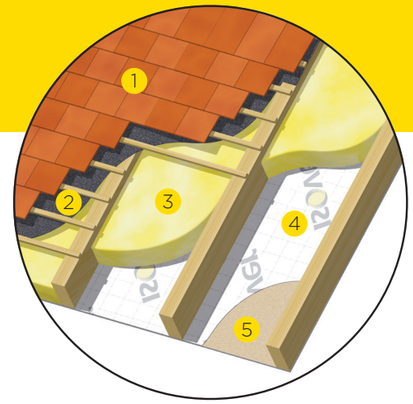
Country	Minimum standards for thermal U-values (W/m²K)
England	0.2
Scotland	0.15
Wales	0.15

Table of performance

U-value achieved (W/m²K)	Between joists		Over joists	
	Insulation	Thickness (mm)	Insulation	Thickness (mm)
0.15	Spacesaver/ Spacesaver Lite	100	Spacesaver/ Spacesaver Lite	200
0.10	Spacesaver Plus	100	Spacesaver Plus	300 (150+150)
0.08	Spacesaver Plus	100	Spacesaver Plus	400 (200+200)

The table above shows a selection of system details. For additional options, or for further guidance, please contact our Technical Advice Centre on 0115 945 1143.

Pitched Roof - Rafter Level



Detail

1. Tiled or slated roof on tiling battens
2. Breathable membrane
3. Isover insulation between the rafters
4. Recommended: Isover Vario® XtraSafe Membrane System
5. Board Lining (thermal laminate option or counter batten filled with insulation not shown)

Acoustic | **Thermal** | **Airtightness & Moisture Management** | **Non combustible**

UK Building Regulations

Country	Minimum standards for thermal U-values (W/m²K)
England	0.2
Scotland	0.15
Wales	0.15

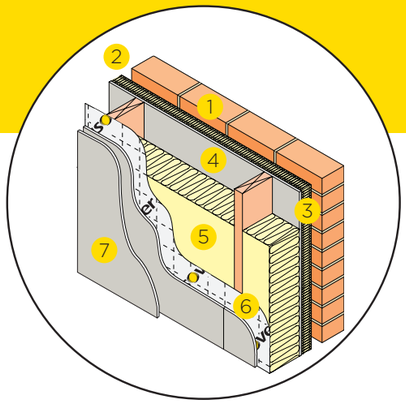
Table of performance

U-value (W/m²K)*	Insulation between Rafters @ 600mm centres*	Below rafters
0.19	125mm Metac	53mm Gyproc ThermaLine PIR
0.18	125mm Metac	63mm Gyproc ThermaLine PIR
0.17	175mm Metac	50mm Metac between counter battens plus 12.5mm Gyproc Wallboard
0.16	175mm Metac	53mm Gyproc ThermaLine PIR
0.15	175mm Metac	63mm Gyproc ThermaLine PIR
0.14	200mm Metac	53mm Gyproc ThermaLine PIR
0.12	200mm Metac	78mm Gyproc ThermaLine PIR

The tables above show a selection of system details. For additional options, or for further guidance, please contact our Technical Advice Centre on 0115 945 1143.

*Based on 50mm wide rafters.

External Walls



Detail

1. External brick
2. Clear cavity
3. Isover insulation outside frame
4. Sheathing board with breathing membrane applied to exterior side
5. Isover insulation between studs
6. Recommended: Isover Vario® XtraSafe Membrane System
7. 2 x 12.5mm Gyproc Wallboard

Acoustic **Thermal** **Airtightness & Moisture Management** **Non combustible**

UK Building Regulations

Country	Minimum standards for thermal U-values (W/m²K)
England	0.30
Scotland	0.22
Wales	0.21

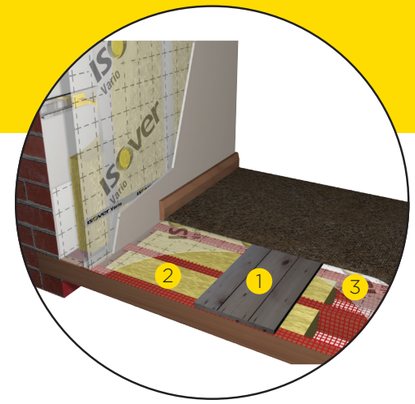
Table of performance

U-value achieved (W/m²K)*	Stud depth (mm)	Insulation between studs	Insulation outside frame	Board lining
0.27	140	Timber Frame Roll/Batt 35	N/A	2 x 12.5mm Gyproc Wallboard
0.26	140	Timber Frame Roll/Batt 32		
0.20	140	Timber Frame Batt 43	Frame Façade Slab 50mm	
0.18	140	Timber Frame Roll/Batt 32		

For additional options, or for further guidance, please contact our Technical Advice Centre on 0115 945 1143.

*Calculations assume a brick outer leaf

Ground Floor



Detail

1. Timber walking surface
2. 200mm Spacesaver or two layers of 100mm Isover Cladding Roll 37 between joists (supported with netting below)
3. Isover Vario® XtraSafe Membrane System

Thermal **Airtightness & Moisture Management** **Non combustible**

UK Building Regulations

Country	Minimum standards for thermal U-values (W/m²K)
England	0.25
Scotland	0.18
Wales	0.18

Table of performance

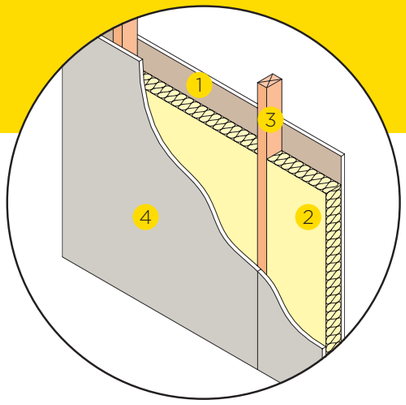
The thermal performance of a ground floor is influenced by the floor's calculated P/A ratio (perimeter divided by area). The table below details guidance on U-values achievable with different P/A ratios.

P/A ratio	Insulation between joists*	
	200mm Spacesaver (W/m²K)	2 x 100mm Cladding Roll 37 (W/m²K)
0.1	0.13	0.12
0.2	0.16	0.15
0.3	0.17	0.16
0.4	0.18	0.17
0.5	0.19	0.17
0.6	0.19	0.18
0.7	0.20	0.18
0.8	0.20	0.18
0.9	0.20	0.18

Joists assumed to be 50mm wide at 450mm centres.
For further guidance, please contact our Technical Advice Centre on 0115 945 1143.

*Supported with netting below

Internal Walls



Detail

1. Board lining - see table below
2. Isover Acoustic Partition Roll (APR 1200) between studs
3. Timber studs
4. Board lining - see table below

Acoustic **Non combustible**

UK Building Regulations

Country	Minimum standards for sound insulation dB (Rw)
England	40
Scotland	40
Wales	40

The above table details the current building regulations for acoustic insulation in internal walls. However, optimising acoustic comfort for inhabitants will often require going above the minimum requirements.

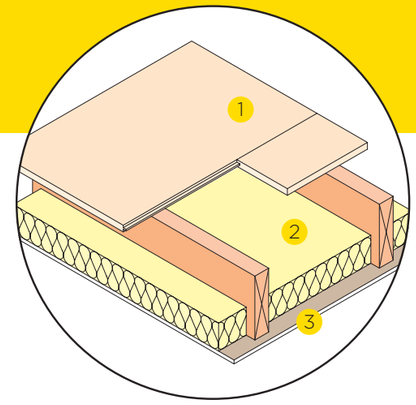
Table of performance

	Partition performance dB (Rw)	Partition thickness (mm)	Stud type	Insulation within stud	Board lining
Timber Stud	41	88	63mmx38mm timber stud	APR 1200 65mm	1 x 12.5mm Gyproc Wallboard
	44	93	63mmx38mm timber stud	APR 1200 50mm	1 x 15mm Gyproc Wallboard
	56	141*	75mmx38mm timber stud	APR 1200 50mm	2 x 12.5mm Gyproc SoundBloc
	59	157*	75mmx38mm timber stud	APR 1200 50mm	2 x 12.5mm Gyproc SoundBloc

The table above shows a selection of system details. For additional options, or for further guidance, please contact our Technical Advice Centre on 0115 945 1143.

* 56dB and 59dB timber stud partitions use Resilient Bars to isolate the plasterboard from the stud.

Internal Floors



Detail

1. Timber joist floor with wood based flooring minimum 15kg/m²
2. 100mm Isover Acoustic Partition Roll (APR 1200)
3. 12.5mm Gyproc WallBoard TEN

Acoustic **Non combustible**

UK Building Regulations

Country	Minimum standards for sound insulation dB (Rw)
England	40
Scotland	43
Wales	40

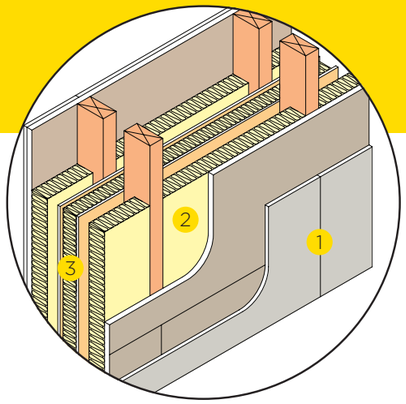
The above detail is consistent with Part E Internal floor type C.

Table of performance

Partition performance dB (Rw)	Insulation between joists	Board lining
40	APR 1200 100mm	12.5mm Gyproc Wallboard
43	APR 1200 100mm	2 x 12.5mm Gyproc Wallboard

The table above shows a selection of system details. For additional options, or for further guidance, please contact our Technical Advice Centre on 0115 945 1143.

Separating Walls



Detail

1. 2 x 12.5mm Gyproc WallBoard
2. Isover Timber Frame Batt 40 between studs
3. Timber Party Wall Roll 50mm

Acoustic **Thermal** **Non combustible**

UK Building Regulations

Country	Minimum standards for thermal U-values (W/m^2K)	Minimum standards for sound insulation dB (DnTw + Ctr)	Minimum standards for sound insulation dB (LnTw)
England	0.2	45	
Scotland	0.2		56
Wales	0.2	45	

Table of performance - England/Wales

	Timber Party Wall	Acoustic performance (DnTw + Ctr dB)	Insulation within stud	Insulation in cavity	Minimum cavity width	Board Lining	Zero u-value
England/ Wales	E-WT-2	≥45	Isover Timber Frame Batt 40 90mm	Timber Party Wall Roll 50mm	50	Gyproc Wallboard	YES (1)

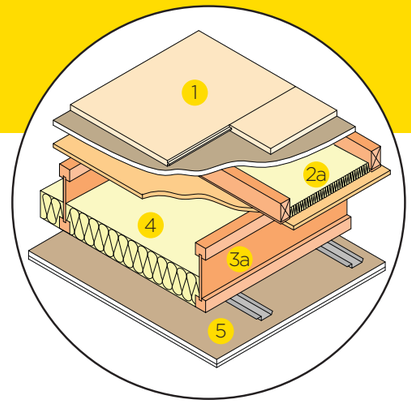
Table of performance - Scotland

	Timber Party Wall	Acoustic performance (DnTw + Ctr dB)	Insulation within stud	Insulation in cavity	Minimum cavity width	Board Lining	Zero u-value
Scotland	V-WT-2	≥56	Isover Timber Frame Batt 40 90mm	Timber Party Wall Roll 50mm	50	Gyproc Wallboard	YES (1)

The table above shows a typical Robust detail for this application. For further guidance, please contact our Technical Advice Centre on 0115 945 1143.

(1) When combined with effective edge sealing using Isover ULTIMATE Cavity Barriers

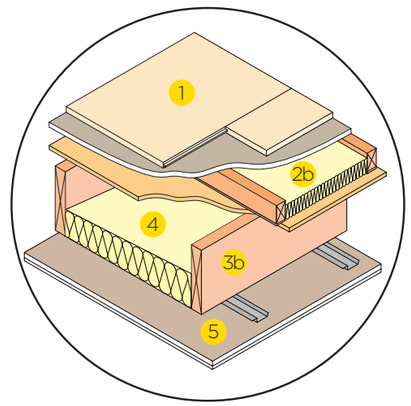
Separating Floors



Detail

1. Floating floor
2a. 25mm Isover APR 1200
2b. 60mm Isover APR 1200
3a. 235mm (min) timber I-joists
3b. 220mm (min) solid timber joists at maximum 400mm centres
4. 100mm Isover APR 1200
5. Ceiling treatment

Acoustic **Non combustible**



UK Building Regulations

Country	Minimum standards for sound insulation dB (DnTw + Ctr)	Minimum standards for sound insulation dB (LnTw)
England	45 (1)	
Scotland		56 (2)
Wales	45 (1)	

(1) Minimum impact sound insulation of 62 LnTw dB also required for separating floors
(2) Minimum impact sound insulation of 56 LnTw dB also required for separating floors

Table of performance

Floor type	Acoustic performance (DnTw + Ctr dB)	Acoustic performance (DnTw dB)	Insulation between I-joists	Insulation between floating floor battens
E-FT-1 (England and Wales)	45		APR 1200 100mm	APR 1200 25mm
3B (Scotland)		56	APR 1200 100mm	APR 1200 25mm

Floor type	Acoustic performance (DnTw + Ctr dB)	Acoustic performance (DnTw dB)	Insulation between standard joists	Insulation between floating floor battens
E-FT-2 (England and Wales)	45		APR 1200 100mm	APR 1200 60mm
3A (Scotland)		56	APR 1200 100mm	APR 1200 60mm

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