



**INSULATION EXCELLENCE**

**APPROVED SOLUTIONS  
FOR ROOFS & WALLS**



**THIN, REFLECTIVE INSULATION  
AND BREATHER MEMBRANES**



© Copyright TLX Insulation Limited 2016

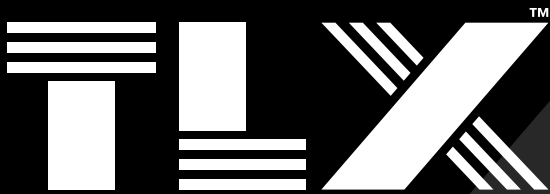
This document is subject to copyright, owned by TLX Insulation Limited. All rights are reserved. Users of the products to which it relates may download, print and copy the document for their own personal purposes. Apart from that limited licence, no part of this document may be reproduced, stored in a retrieval system or transmitted, in any form or by any means (including electronic, mechanical, photocopying, recording or otherwise) without the prior written consent of TLX Insulation Limited.

Without limiting the foregoing general provisions, in particular no person may reproduce, store or transmit any part of this document for any commercial purpose.

TLX Insulation Limited reserves the right to take such actions as it considers necessary to protect its copyright, including but not limited to claiming damages and/or instigating a criminal prosecution under s107 Copyright Designs and Patents Act 1988.

# CONTENTS

|                                            |              |
|--------------------------------------------|--------------|
| About Us                                   | 4            |
| Insulation & Membrane Product Information  | 5            |
| The Importance of Air                      | 6            |
| Condensation                               | 7            |
| <b>WORKING FROM THE OUTSIDE</b>            | <b>8-22</b>  |
| Refurbishment                              | 9            |
| Dual Layer - TLX Gold and TLX Silver       | 14           |
| Barn Conversion / Exposed Rafters          | 16           |
| Extensions / New Builds                    | 18           |
| <b>WORKING FROM THE INSIDE</b>             | <b>23-36</b> |
| Loft Conversions / Extensions / New Build  | 24           |
| Flat Roof                                  | 27-29        |
| Cold Deck                                  | 27           |
| Dormer Cheeks                              | 28           |
| Dwarf Wall                                 | 29           |
| Walls                                      | 30-36        |
| Timber Frame Walls                         | 30           |
| Masonry Cavity Walls                       | 35           |
| Solid Masonry Walls                        | 36           |
| Approved Document Part L1B Requirements    | 37           |
| U Value and Condensation Risk Calculations | 38           |
| General Installation Instructions          | 39-42        |
| Glossary of Terms                          | 43           |



## INSULATION EXCELLENCE

### Insulating membrane technology: boosts thermal performance and manages condensation

Our products improve the thermal performance of a roof or wall. They are combined with standard insulation to save space, avoid a risk of condensation and speed up installation times.

TLX products reduce heat gain in summer and heat loss in winter.

- We have led the industry since 1997:
- 1997 – First three-layer breather membrane
- 2005 – First insulating vapour barrier
- 2008 – First insulating breather membrane
- 2010 – First hybrid insulation guide

All our products are backed up by the BBA and LABC Registered Details.

For any hybrid system you only need **TLX Silver** and **TLX Gold** for 90% of the solutions. From the outside you need a product which breathes but doesn't require a vapour barrier – **TLX Gold**. From the inside you need a vapour barrier which doesn't breathe – **TLX Silver**. It's as simple as that.

We have a team of specialists who understand the problems associated with the UK building stock. They will work with you to reduce installation costs and get the best thermal performance from the available space.

So, when you buy a **TLX** product you get the resources and knowledge of a company which sets the standards of excellence for thin reflective insulation.



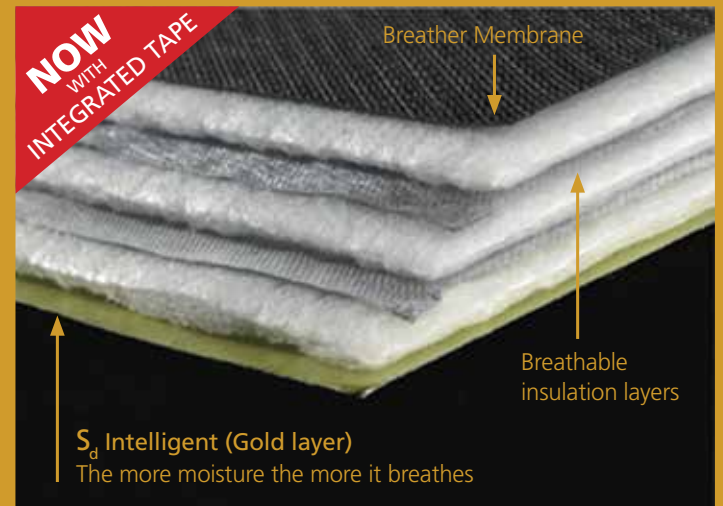
We've got the answers... just ask



## THE EASY WAY TO INSULATE ABOVE RAFTERS

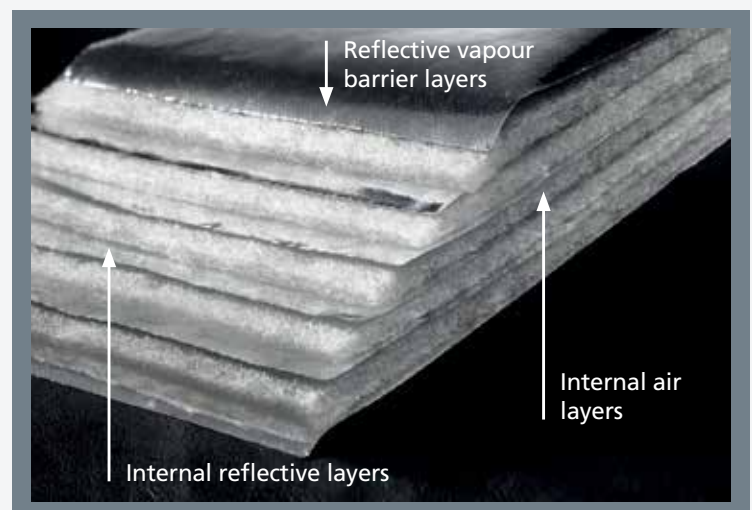
TLX Gold is an 'S<sub>d</sub> intelligent' 2 in 1 insulating breather membrane. It doesn't need a vapour barrier to avoid condensation risk. It adjusts its rate of breathability according to the amount of moisture. TLX Gold is completely watertight and air tight. It is simply rolled out across rafters and can be installed without raising the roof height. On its own, TLX Gold can reduce heat loss by 81%.

### How does TLX Gold 2 in 1 work?



## INSULATES FROM THE INSIDE

TLX Silver wraps the inside of buildings. It prevents condensation risk by stopping moisture entering the roof void from the inside of the building. Installed to the underside of rafters and across joists, it's also certified for use in timber frame and solid masonry walls. Combined with other products TLX Silver can deliver U-values as low as 0.13 W/m<sup>2</sup>K in a standard roof.



## THIN REFLECTIVE INSULATION

- Made in Britain
- Over 100 thousand houses insulated with TLX
- BBA certified
- Worldwide patents
- Approved for roofs and walls



| TECHNICAL DATA          | TLX GOLD                | TLX SILVER              |
|-------------------------|-------------------------|-------------------------|
| Width                   | 1200mm                  | 1200mm                  |
| Weight                  | 900 g/m <sup>2</sup>    | 545 g/m <sup>2</sup>    |
| Yield                   | 12 m <sup>2</sup>       | 12 m <sup>2</sup>       |
| Core R Value            | 0.85 m <sup>2</sup> K/W | 0.91 m <sup>2</sup> K/W |
| Water vapour resistance | 0.50 MNs/g              | 1200 MNs/g              |
| Emissivity              | 0.16                    | 0.05                    |
| Length                  | 10m                     | 10m                     |

## BREATHER MEMBRANES

- Over 100 million metres sold worldwide
- Approved for use in cold, non-ventilated roof systems
- Approved for use in walls
- Lightweight, high strength, slip resistant
- Made in the UK

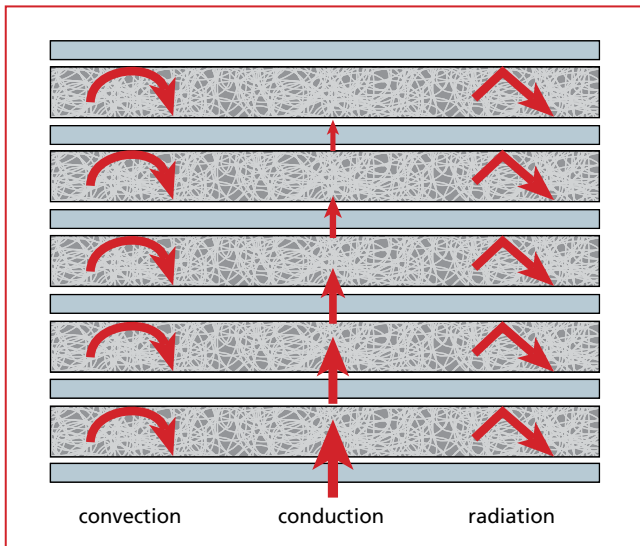


| TECHNICAL DATA          | STANDARD                    | PROFESSIONAL                | HEAVY DUTY                  |
|-------------------------|-----------------------------|-----------------------------|-----------------------------|
| Width                   | 1m, 1.5m                    | 1m, 1.5m                    | 1m, 1.5m                    |
| Weight                  | 112 g/m <sup>2</sup>        | 130 g/m <sup>2</sup>        | 165 g/m <sup>2</sup>        |
| Tensile strength, MD    | 285 N/50mm                  | 305 N/50mm                  | 420 N/50mm                  |
| Tensile strength, CD    | 180 N/50mm                  | 195 N/50mm                  | 245 N/50mm                  |
| Nail tear MD            | 148 N                       | 148 N                       | 190 N                       |
| Nail tear CD            | 198 N                       | 198 N                       | 240 N                       |
| Water vapour resistance | 0.21 MNs/g                  | 0.19 MNs/g                  | 0.21 MNs/g                  |
| MVTR                    | >1500 g/m <sup>2</sup> 24hr | >1500 g/m <sup>2</sup> 24hr | >1500 g/m <sup>2</sup> 24hr |
| Hydrostatic head        | >200 cm H <sub>2</sub> O    | >200 cm H <sub>2</sub> O    | >200 cm H <sub>2</sub> O    |
| Colour                  | Black / White               | Black / White               | Black                       |

# THE IMPORTANCE OF AIR

## Heat transfer explained

TLX thin, reflective insulation works by controlling the three ways in which heat is lost from a building:

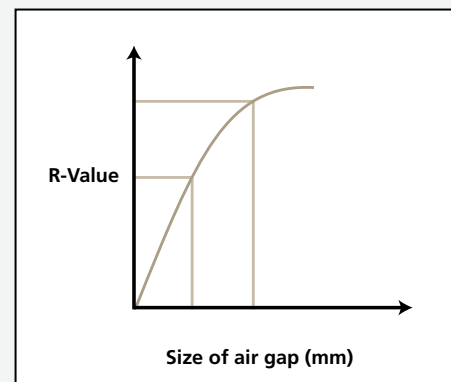
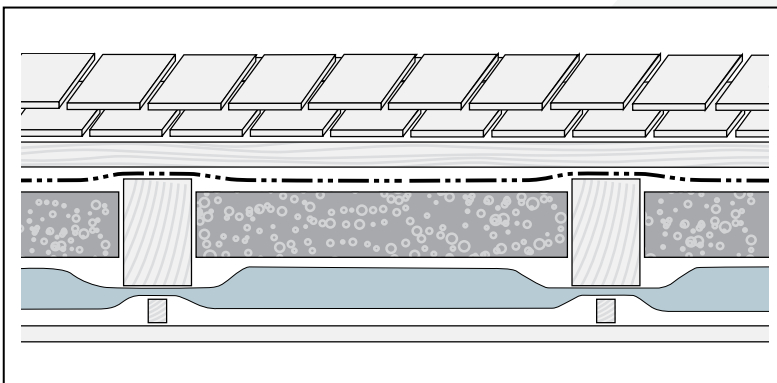


The outermost layers have low emissivity surfaces. These both reflect infrared radiation back into the house and prevent the house from emitting radiation to the outside. Inner layers of thick material such as wadding reduce heat loss by conduction through the multifoil, and inner layers of film prevent air movement. In addition, the insulation forms an airtight barrier reducing leakage of warm air to the outside.

These types of insulation can either be water vapour barriers or vapour permeable depending on their materials of construction.

TLX thin reflective insulation products are welded to form a seam along each edge, which is preferable to stitching. Air and water vapour movement through stitching holes reduces thermal performance and can lead to condensation problems.

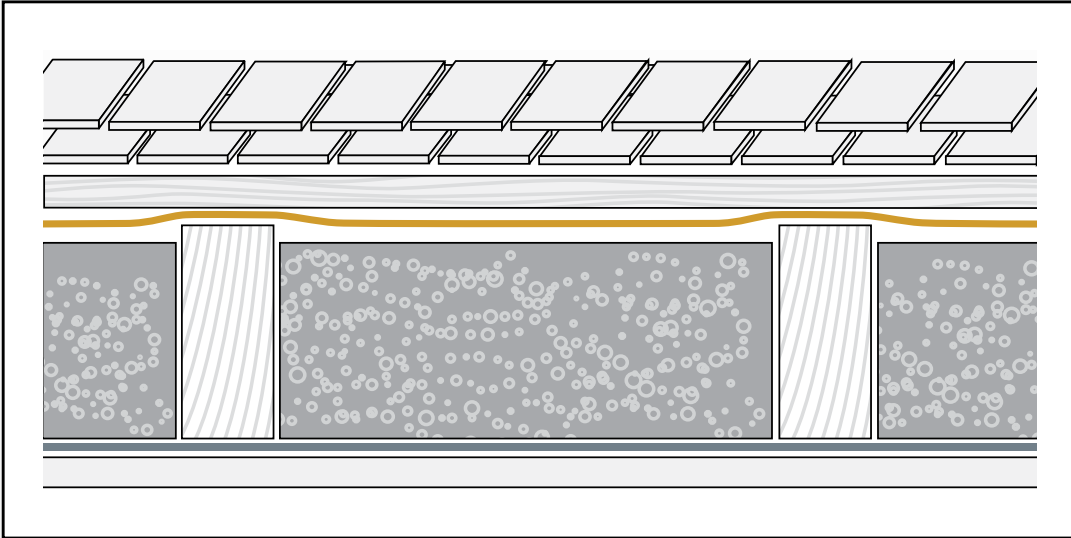
## Using air gaps to minimise radiant heat loss



To achieve the optimal thermal performance with thin reflective insulation, it is important to provide small unventilated (still) air gaps adjacent to the reflective low emissivity surfaces. The air gaps should ideally be 20mm to achieve the optimal performance, taking into account the compression and expansion of the thin reflective insulation material.

# CONDENSATION

When retrofitting insulation in an existing building, one of the main considerations is condensation. Older buildings are generally leaky and rely on air movement through the building fabric to remove moisture-laden vapour from the building and avoid a condensation problem. The main concern is trapping condensation inside the structure (e.g. rafters), otherwise known as interstitial condensation.



In order to avoid interstitial condensation it is important to have the correct material in the correct location.

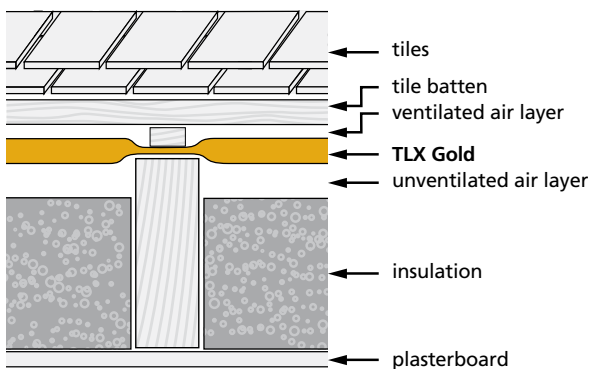
There are two approaches to dealing with vapour:

- Stop vapour getting into the structure by using a vapour barrier on the warm side of the structure
- If vapour gets into the structure, ensure it is able to escape out from the cold side of the building by using vapour permeable materials.

Since managing moisture inside a building is complicated, a condensation analysis is used to assess the risk when using either approach.

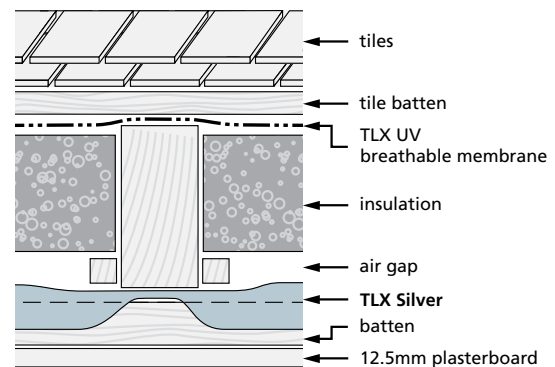
## WORKING FROM THE OUTSIDE

### TLX Gold 2 in 1 Insulating Breather Membrane



## WORKING FROM THE INSIDE

### TLX Silver 2 in 1 Insulating Vapour Barrier





**GOLD<sup>2IN1</sup>**

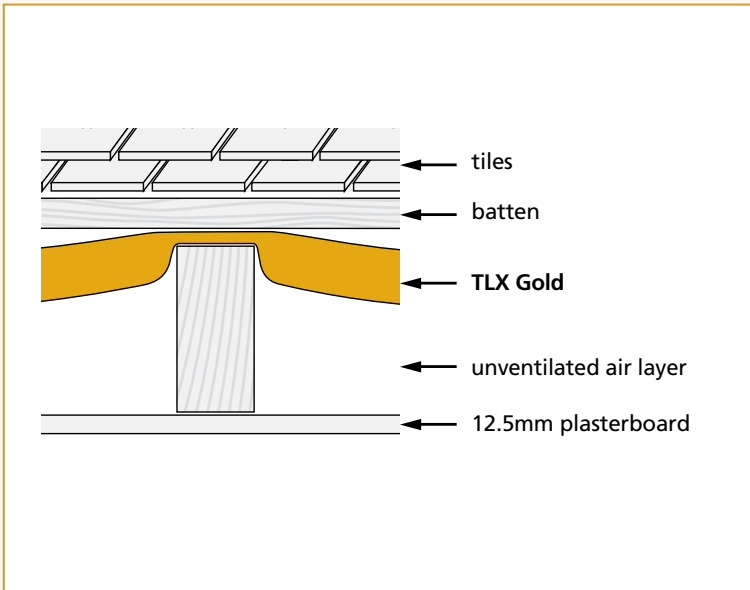
INSULATING BREATHER MEMBRANE

# WORKING FROM THE OUTSIDE





## TLX Gold single layer draped



Much of the existing stock of buildings, particularly housing, was built when energy performance standards were lower than today. Upgrading these properties is essential if future carbon emissions are to be reduced. Two potential measures are improved insulation and airtightness, but traditional insulation materials struggle to overcome the constraints in 'difficult to upgrade' buildings such as historic buildings, and houses with vaulted ceilings or room-in-roof structures.

TLX Gold allows the simple upgrading of existing buildings by reducing heat loss through the fabric of the building and reducing air leakage, without causing condensation.

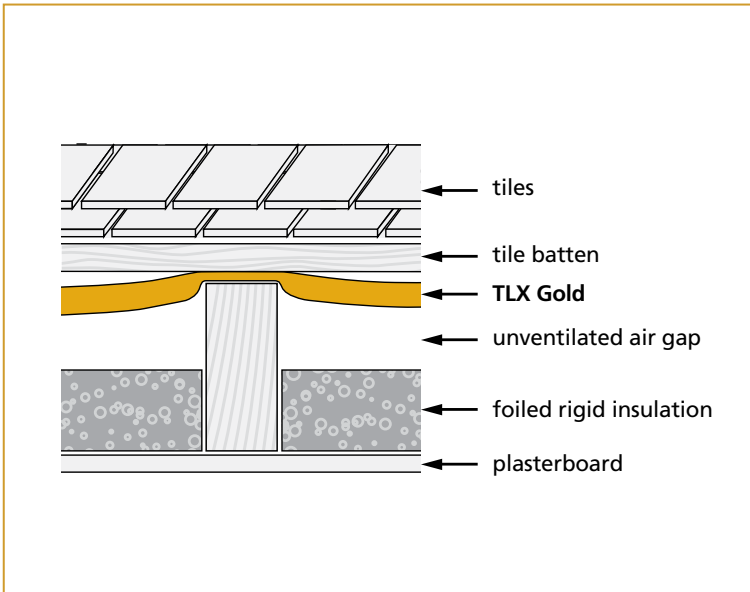
The most difficult situation is a house where interior space is extremely limited, and the roof-line cannot be raised - for example with a listed building, or a terraced or semi-detached house. The rafter space must accommodate both insulation and roofing underlay, but cannot be extended in either direction.

### 75mm deep rafters

In older houses, the lath and plaster ceiling may intrude into the lower 20mm of the rafter space, leaving very limited space. TLX Gold is installed above the rafters as a single layer, combining insulation and breather membrane. The TLX Gold must be draped a minimum of 10mm into the rafter space so that tile battens can be fitted directly above. The drape creates a channel for air movement, and also so that any rain water or snow that penetrates the outer covering can run down to the gutter. The roof line is not raised and the external appearance is not affected.

The U value of the refurbished structure is 0.69 W/m<sup>2</sup>K. This U value does not meet the prescribed standard for new build, but in cases of simple improvement may be the best that can be practically obtained.

## TLX Gold draped with insulation between rafters

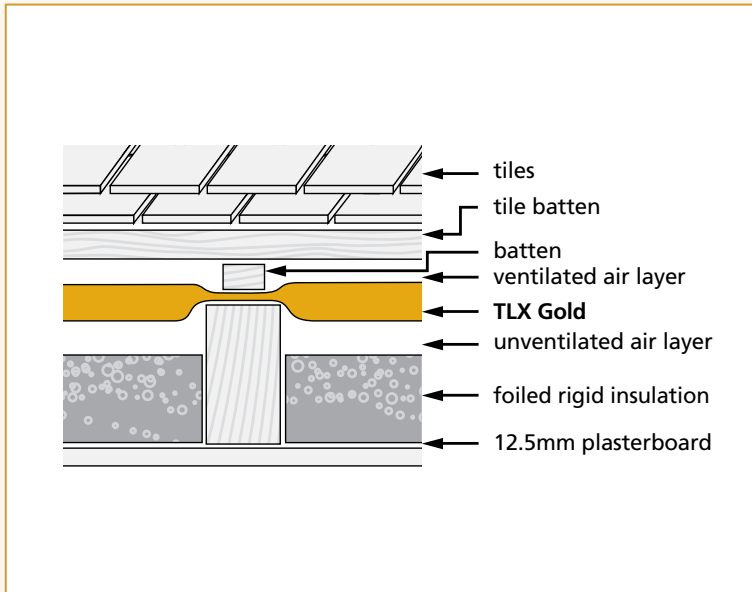


Where the roofline cannot be raised, it is possible to install TLX Gold draped over the rafters. TLX Gold will drape into the rafter by 50mm, taking into account a small unventilated air gap between the TLX Gold and additional insulation between the rafters.

## TLX Gold draped above rafter with insulation between rafters

|                     | Insulation Thickness (mm) | U value W/m <sup>2</sup> K |                |                          |
|---------------------|---------------------------|----------------------------|----------------|--------------------------|
|                     |                           | Phenolic<br>λ 0.020        | PIR<br>λ 0.022 | Mineral Fibre<br>λ 0.032 |
| Rafter Depth 75 mm  | 25                        | 0.44                       | 0.45           | 0.51                     |
| Rafter Depth 100 mm | 50                        | 0.32                       | 0.33           | 0.39                     |
| Rafter Depth 150 mm | 100                       | 0.21                       | 0.22           | 0.26                     |

## TLX Gold taut and counter battened with insulation between rafters

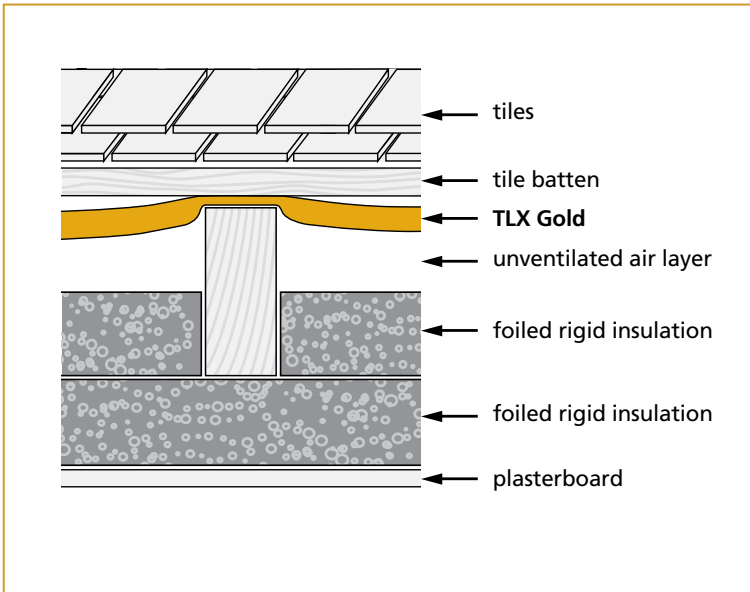


Where the roofline can be raised slightly, it is possible to install TLX Gold taut above the rafters, leaving enough rafter space for additional insulation. TLX Gold must be counter battened with minimum 38mm deep battens before the tile battens are fitted to create the channel required for air and water movement.

### TLX Gold taut above rafter with insulation between rafters, 38mm batten

|                     | Insulation Thickness (mm) | U value W/m <sup>2</sup> K |                |                          |
|---------------------|---------------------------|----------------------------|----------------|--------------------------|
|                     |                           | Phenolic<br>λ 0.020        | PIR<br>λ 0.022 | Mineral Fibre<br>λ 0.032 |
| Rafter Depth 75 mm  | 50                        | 0.33                       | 0.34           | 0.4                      |
| Rafter Depth 100 mm | 75                        | 0.26                       | 0.27           | 0.33                     |
| Rafter Depth 150 mm | 125                       | 0.18                       | 0.19           | 0.23                     |

## TLX Gold draped with insulation between and below rafters

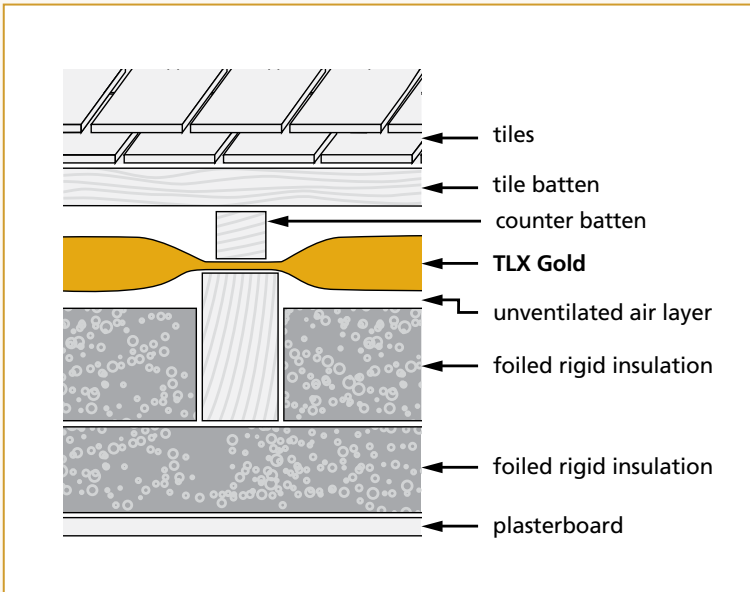


If there is scope to add additional insulation to the underside of the rafters as well as the between-rafter insulation, this can further improve the thermal performance of the roof and will also limit thermal bridging.

## TLX Gold draped above rafter with insulation between and below rafters

|                        | Insulation Thickness<br>Between Rafters (mm) | Insulation Thickness<br>Below Rafters (mm) | U value W/m <sup>2</sup> K |                |
|------------------------|----------------------------------------------|--------------------------------------------|----------------------------|----------------|
|                        |                                              |                                            | Phenolic<br>λ 0.020        | PIR<br>λ 0.022 |
| Rafter Depth<br>75 mm  | 25                                           | 25                                         | 0.29                       | 0.3            |
| Rafter Depth<br>100 mm | 50                                           | 50                                         | 0.18                       | 0.19           |
| Rafter Depth<br>150 mm | 100                                          | 100                                        | 0.13                       | 0.14           |

## TLX Gold taut and counter battened with insulation between and below rafters



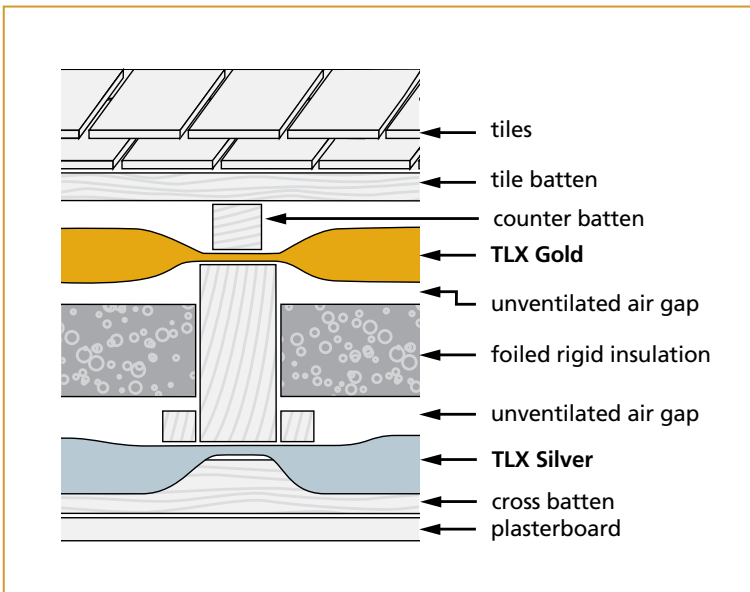
If there is scope to add additional insulation to the underside of the rafters as well as the between - rafter insulation, this can further improve the thermal performance of the roof and will also limit thermal bridging.

### TLX Gold taut above rafter with insulation between and below rafters

|                        | Insulation Thickness<br>Between Rafters (mm) | Insulation Thickness<br>Below Rafters (mm) | U value W/m <sup>2</sup> K |                |
|------------------------|----------------------------------------------|--------------------------------------------|----------------------------|----------------|
|                        |                                              |                                            | Phenolic<br>λ 0.020        | PIR<br>λ 0.022 |
| Rafter Depth<br>75 mm  | 50                                           | 50                                         | 0.18                       | 0.19           |
| Rafter Depth<br>100 mm | 75                                           | 50                                         | 0.15                       | 0.16           |
| Rafter Depth<br>150 mm | 120                                          | 50                                         | 0.12                       | 0.13           |

# DUAL LAYER - TLX GOLD AND TLX SILVER

## TLX Gold taut with rigid insulation between rafters and TLX Silver below rafters



TLX Gold and TLX Silver can be combined when you have access from both the outside and inside of the building. TLX Gold is installed taut and counter battened over the top of the rafters. The additional rigid insulation board between the rafters is fitted raised up 30mm from the bottom of the rafters maintaining an unventilated air gap either side of the board. TLX Silver is then fitted to the underside of the rafters and secured with 38mm deep battens fitted crosswise then followed by the plasterboard.

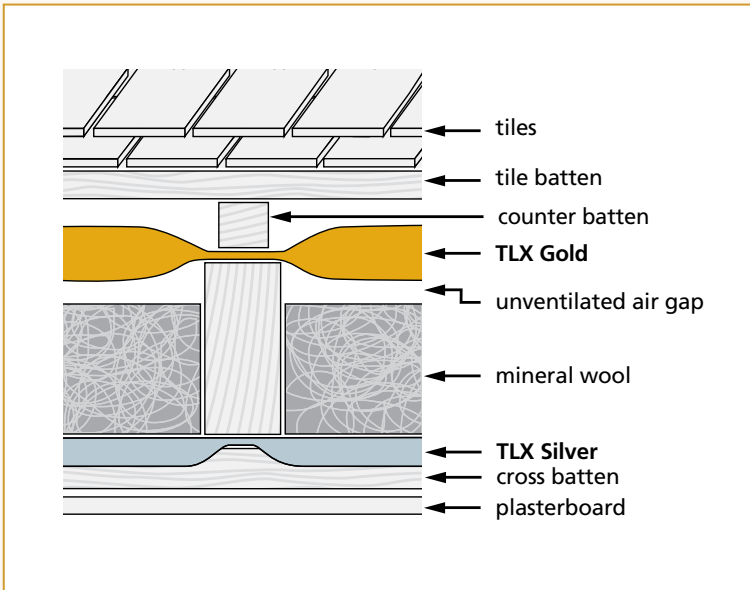
### TLX Gold taut above rafter, Phenolic Foam ( $\lambda 0.020$ ) between rafter, TLX Silver below rafter, 38mm Batten

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 55                          | 125               | 70                          | 145               | 85                          | 155               | 110                         | 185               |
| Rafter Centres 600 mm | 45                          | 115               | 65                          | 135               | 75                          | 145               | 100                         | 170               |

### TLX Gold taut above rafter, PIR ( $\lambda 0.022$ ) between rafter, TLX Silver below rafter, 38mm Batten

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 60                          | 130               | 80                          | 150               | 90                          | 160               | 120                         | 190               |
| Rafter Centres 600 mm | 50                          | 115               | 70                          | 140               | 80                          | 150               | 110                         | 180               |

## TLX Gold taut and counter battened with Mineral Wool between rafters and TLX Silver below rafters



TLX Gold and TLX Silver can be combined when you have access from both the outside and inside of the building. TLX Gold is installed taut and counter battened over the top of the rafters. The additional mineral wool insulation is fitted between the rafters. TLX Silver is then fitted to the underside of the rafters secured by 38mm deep battens fitted crosswise then followed by the plasterboard.

### TLX Gold taut above rafter, Mineral Wool ( $\lambda 0.032$ ) between rafter, TLX Silver below rafter, 38mm Batten

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 100                         | 150               | 130                         | 180               | 145                         | 195               | 185                         | 235               |
| Rafter Centres 600 mm | 95                          | 145               | 120                         | 170               | 135                         | 185               | 170                         | 220               |

### TLX Gold taut above rafter, Mineral Wool ( $\lambda 0.035$ ) between rafter, TLX Silver below rafter, 38mm Batten

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 110                         | 160               | 140                         | 190               | 155                         | 205               | 200                         | 250               |
| Rafter Centres 600 mm | 100                         | 150               | 130                         | 180               | 150                         | 200               | 180                         | 235               |

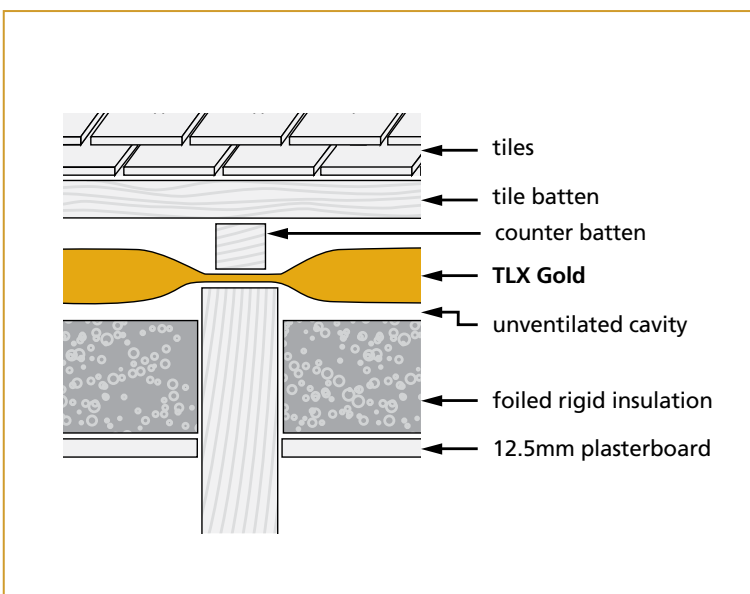
# BARN CONVERSION / EXPOSED RAFTERS

Although not limited to barn conversions, exposed rafters often come hand in hand with buildings of this type where retaining their character is important. They tend to be shallow and set at narrow and uneven centres.

The key to finding an exposed rafter solution that suits a particular project is compromise, since fully exposed rafters, not raising the roofline and achieving a U value 0.18 W/m<sup>2</sup>K is impossible.

The TLX exposed rafter solution aims to compromise on the amount of rafter exposed, raising the roofline, or a bit of both. Any compromise on U value targets can be accounted for by our Technical Team and supporting calculations supplied.

## TLX Gold, semi exposed rafter, rigid board between rafters



TLX Gold is a 2 in 1 insulating breather membrane primarily designed to be used across the top of the rafters with additional insulation between the rafters. TLX Gold's top layer is a breathable membrane and so no additional roofing underlay is required. Rigid insulation board such as PIR or Phenolic board is fitted between the rafters, maintaining an air cavity of 20mm minimum between the board and the TLX Gold. Plasterboard can then be fixed between the rafters to maintain an exposed rafter internally.

Due to the water vapour permeability of TLX Gold, a vapour control layer is not required. However it is still important to ensure the rigid board insulation and the plasterboard ceiling are both well sealed.

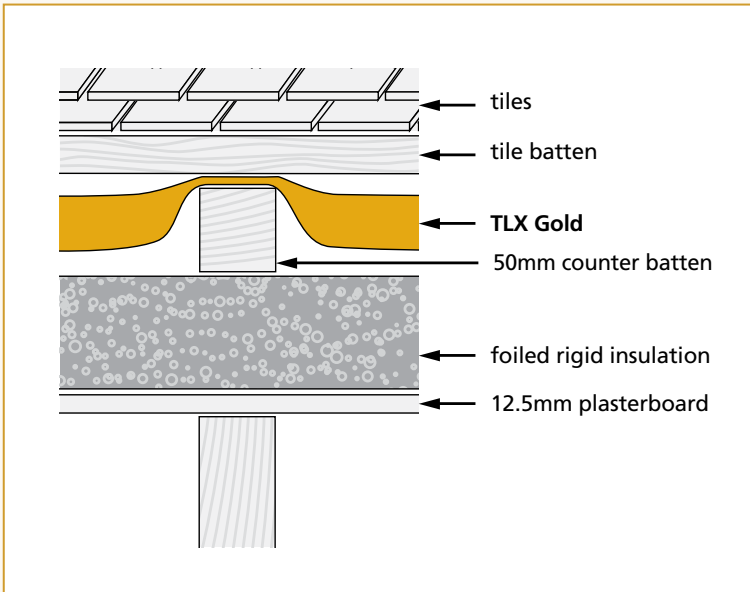
The most effective way to alter the U value is to vary the thickness of rigid insulation. However, the cavity between TLX Gold and the rigid insulation should be maintained.

### TLX Gold above rafter, rigid board between semi exposed rafters, 38mm batten

|                          | U = 0.18 W/m <sup>2</sup> K |                | U = 0.16 W/m <sup>2</sup> K |                | U = 0.15 W/m <sup>2</sup> K |                | U = 0.13 W/m <sup>2</sup> K |                |
|--------------------------|-----------------------------|----------------|-----------------------------|----------------|-----------------------------|----------------|-----------------------------|----------------|
|                          | Phenolic<br>λ 0.020         | PIR<br>λ 0.022 | Phenolic<br>λ 0.020         | PIR<br>λ 0.022 | Phenolic<br>λ 0.020         | PIR<br>λ 0.022 | Phenolic<br>λ 0.020         | PIR<br>λ 0.022 |
| Rafter Centres<br>400 mm | 120                         | 125            | 140                         | 150            | 150                         | 160            | 180                         | 195            |
| Rafter Centres<br>600 mm | 105                         | 115            | 120                         | 130            | 130                         | 140            | 160                         | 170            |



## TLX Gold, fully exposed rafter, PIR above rafters



Plasterboard is first fitted above the rafters with a rigid insulation board such as PIR or Phenolic board fitted above it. A 50mm deep counter batten is then fitted above the rigid insulation board maintaining an air cavity of 10mm minimum between the board and the TLX Gold.

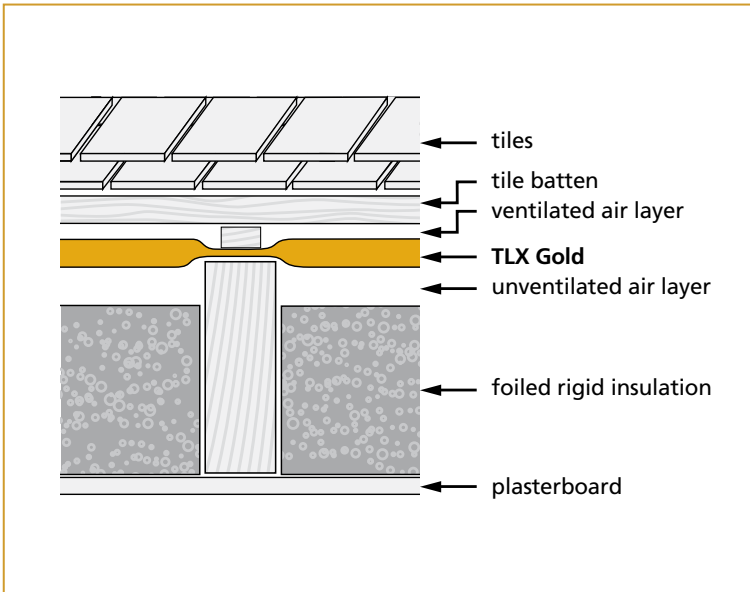
Due to the water vapour permeability of TLX Gold, a vapour control layer is not required. However it is still important to ensure the rigid board insulation and the plasterboard ceiling are both well sealed.

The most effective way to alter the U value is to vary the thickness of rigid insulation. However, the cavity between TLX Gold and the rigid insulation should be maintained.

## TLX Gold draped above rafter, rigid board above fully exposed rafters

|                          | U = 0.18 W/m <sup>2</sup> K |                | U = 0.16 W/m <sup>2</sup> K |                | U = 0.15 W/m <sup>2</sup> K |                | U = 0.13 W/m <sup>2</sup> K |                |
|--------------------------|-----------------------------|----------------|-----------------------------|----------------|-----------------------------|----------------|-----------------------------|----------------|
|                          | Phenolic<br>λ 0.020         | PIR<br>λ 0.022 | Phenolic<br>λ 0.020         | PIR<br>λ 0.022 | Phenolic<br>λ 0.020         | PIR<br>λ 0.022 | Phenolic<br>λ 0.020         | PIR<br>λ 0.022 |
| Rafter Centres<br>400 mm | 85                          | 90             | 95                          | 105            | 105                         | 115            | 125                         | 135            |
| Rafter Centres<br>600 mm | 80                          | 90             | 95                          | 105            | 105                         | 115            | 120                         | 135            |

## TLX Gold above rafter, rigid board between rafter



TLX Gold is a 2 in 1 insulating breather membrane primarily designed to be used across the top of the rafters with additional insulation between the rafters. TLX Gold's top layer is a breathable membrane and so no additional roofing underlay is required. Rigid insulation board such as PIR or Phenolic board is fitted between the rafters, maintaining an air cavity of 20mm minimum between the board and the TLX Gold. Plasterboard can then be fixed directly to the underside of the rafters.

Due to the water vapour permeability of TLX Gold, a vapour control layer is not required in any of these solutions. However, it is vital that the plasterboard ceiling and rigid board insulation are both well sealed, and that air flow between the roof covering and TLX Gold is not restricted. Any changes to these solutions may result in a vapour control layer being required.

### TLX Gold taut above rafter, Phenolic Foam ( $\lambda 0.020$ ) between rafter, 38mm Batten

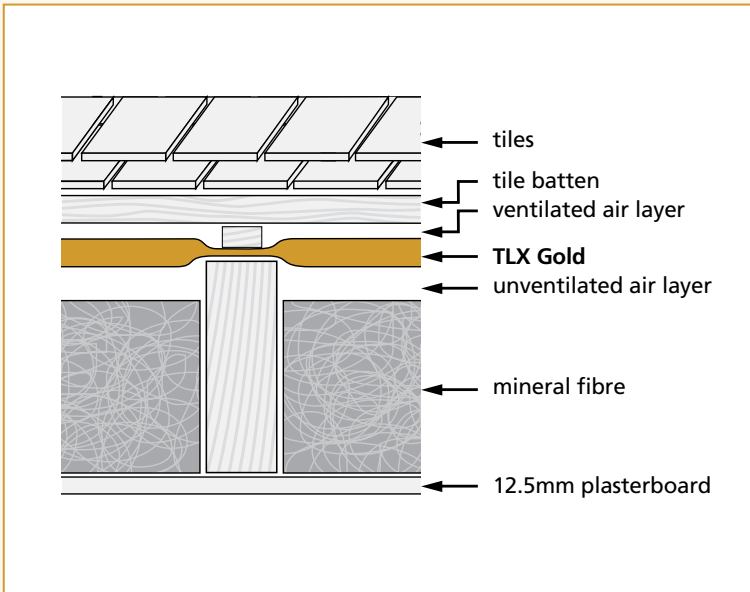
|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 120                         | 160               | 140                         | 180               | 150                         | 190               | 180                         | 225               |
| Rafter Centres 600 mm | 105                         | 140               | 120                         | 160               | 130                         | 170               | 160                         | 200               |

### TLX Gold taut above rafter, PIR ( $\lambda 0.022$ ) between rafter, 38mm Batten

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 125                         | 165               | 150                         | 190               | 160                         | 200               | 240                         | 280               |
| Rafter Centres 600 mm | 110                         | 150               | 130                         | 170               | 140                         | 180               | 170                         | 210               |

The most effective way to alter the U value is to vary the thickness of rigid insulation. However, the cavity between TLX Gold and the rigid insulation should be maintained.

## TLX Gold above rafter, mineral wool between rafters



TLX Gold is a 2 in 1 insulating breather membrane, primarily designed to be used across the top of the rafters with additional insulation between the rafters. TLX Gold's top layer is a breathable membrane and so no additional roofing underlay is required. Additional insulation such as mineral wool is fitted between the rafters with an air cavity of around 20mm maintained between the mineral wool and the TLX Gold. Plasterboard can then be fixed directly to the underside of the rafters.

Due to the water vapour permeability of TLX Gold, a vapour control layer is not required in any of these solutions. However, it is vital that the plasterboard ceiling is well sealed and that air flow between the roof covering and TLX Gold is not restricted. Any changes to these solutions may result in a vapour control layer being required.

### TLX Gold taut above rafter, Mineral Wool ( $\lambda 0.032$ ) between rafter, 38mm Batten

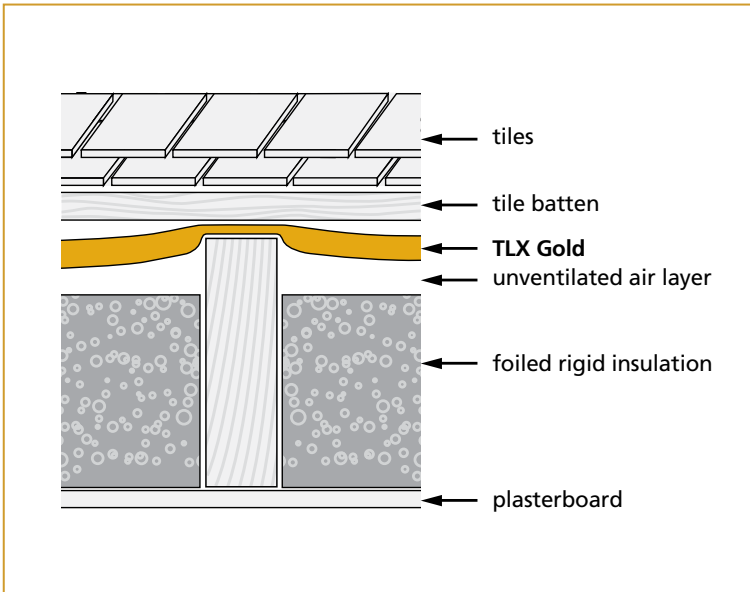
|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 170                         | 210               | 200                         | 240               | 210                         | 255               | 255                         | 295               |
| Rafter Centres 600 mm | 150                         | 195               | 180                         | 220               | 195                         | 235               | 230                         | 270               |

### TLX Gold taut above rafter, Mineral Wool ( $\lambda 0.035$ ) between rafter, 38mm Batten

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 180                         | 220               | 210                         | 250               | 225                         | 265               | 270                         | 310               |
| Rafter Centres 600 mm | 165                         | 205               | 190                         | 230               | 210                         | 250               | 250                         | 290               |

The most effective way to alter the U value is to vary the thickness of mineral wool. However, the cavity between TLX Gold and the mineral wool should be maintained.

## TLX Gold draped above rafter, rigid board between rafter



If the top 60mm of the rafter space is not filled with insulation, then TLX Gold can be laid across the rafters and allowed to drape down into the rafter space. Provided the TLX Gold forms a 10mm deep channel in the centre of the rafter space, then tile battens can be fitted directly on top of the TLX Gold without the need to counter batten.

Rigid insulation board is fitted between the rafters, maintaining an unventilated air cavity between the board and the TLX Gold. Plasterboard is fitted directly to the underside of the rafters.

It is important to ensure that the rigid board insulation and the plasterboard ceiling are well sealed to prevent excessive amounts of water vapour entering the roof structure.

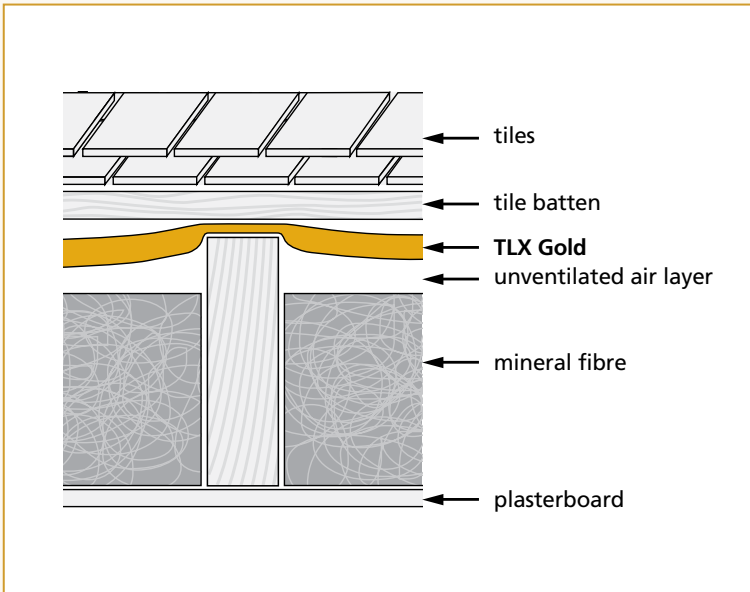
### TLX Gold draped above rafter, Phenolic Foam ( $\lambda 0.020$ ) between rafter

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 115                         | 175               | 135                         | 195               | 150                         | 210               | 180                         | 240               |
| Rafter Centres 600 mm | 100                         | 160               | 120                         | 180               | 130                         | 190               | 155                         | 215               |

### TLX Gold draped above rafter, PIR ( $\lambda 0.022$ ) between rafter

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 125                         | 185               | 145                         | 205               | 160                         | 220               | 190                         | 250               |
| Rafter Centres 600 mm | 110                         | 165               | 130                         | 185               | 140                         | 200               | 170                         | 225               |

## TLX Gold draped above rafter, mineral wool between rafters



If the top 60mm of the rafter space is not filled with insulation, then TLX Gold can be laid across the rafters and allowed to drape down into the rafter space. Provided the TLX Gold forms a 10mm deep channel in the centre of the rafter space, then tile battens can be fitted directly on top of the TLX Gold without the need to counter batten.

Mineral fibre is fitted between the rafters, maintaining an unventilated air cavity between the board and the TLX Gold. Plasterboard is fitted directly to the underside of the rafters.

It is important to ensure that the plasterboard ceiling is well sealed to prevent excessive amounts of water vapour entering the roof structure.

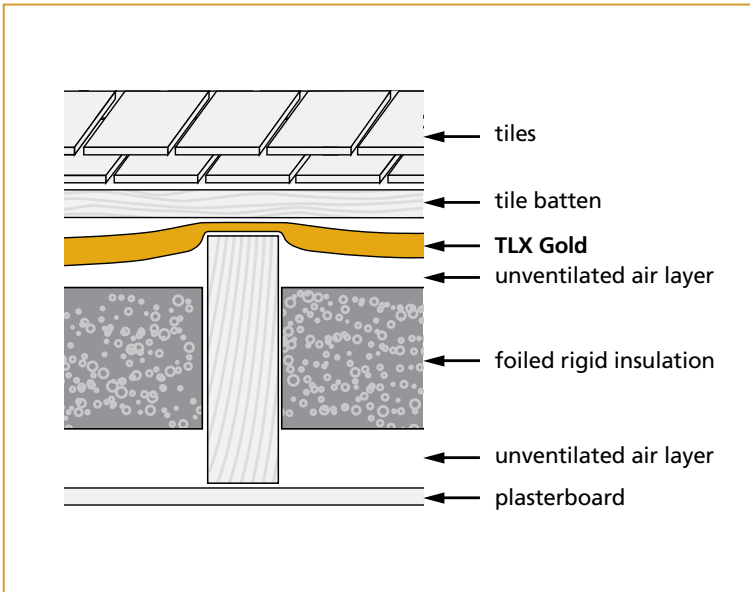
### TLX Gold taut above rafter, Mineral Wool ( $\lambda 0.032$ ) between rafter

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 165                         | 225               | 190                         | 255               | 210                         | 270               | 250                         | 310               |
| Rafter Centres 600 mm | 150                         | 210               | 175                         | 235               | 190                         | 250               | 230                         | 290               |

### TLX Gold taut above rafter, Mineral Wool ( $\lambda 0.035$ ) between rafter

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 175                         | 235               | 205                         | 265               | 220                         | 285               | 265                         | 325               |
| Rafter Centres 600 mm | 160                         | 220               | 190                         | 250               | 205                         | 265               | 250                         | 310               |

## TLX Gold draped above rafter, rigid board centrally between rafter



If the top 60mm of the rafter space is not filled with insulation, then TLX Gold can be laid across the rafters and allowed to drape down into the rafter space. Provided the TLX Gold forms a 10mm deep channel in the centre of the rafter space, then tile battens can be fitted directly on top of the TLX Gold without the need to counter batten.

Rigid insulation board is fitted centrally between the rafters, maintaining an unventilated air cavity on both sides of the board. It is essential that the sides of the rigid board fit closely between the rafters to avoid air movement. If necessary, the junction of the board and rafter should be sealed with a sealant. Plasterboard is fitted directly to the underside of the rafters.

It is important to ensure that the rigid board insulation and the plasterboard ceiling are well sealed to prevent excessive amounts of water vapour entering the roof structure.

### TLX Gold draped above rafter, Phenolic Foam ( $\lambda 0.020$ ) between rafter

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 100                         | 180               | 120                         | 200               | 135                         | 215               | 165                         | 245               |
| Rafter Centres 600 mm | 90                          | 170               | 105                         | 185               | 115                         | 195               | 140                         | 225               |

### TLX Gold draped above rafter, PIR ( $\lambda 0.022$ ) between rafter

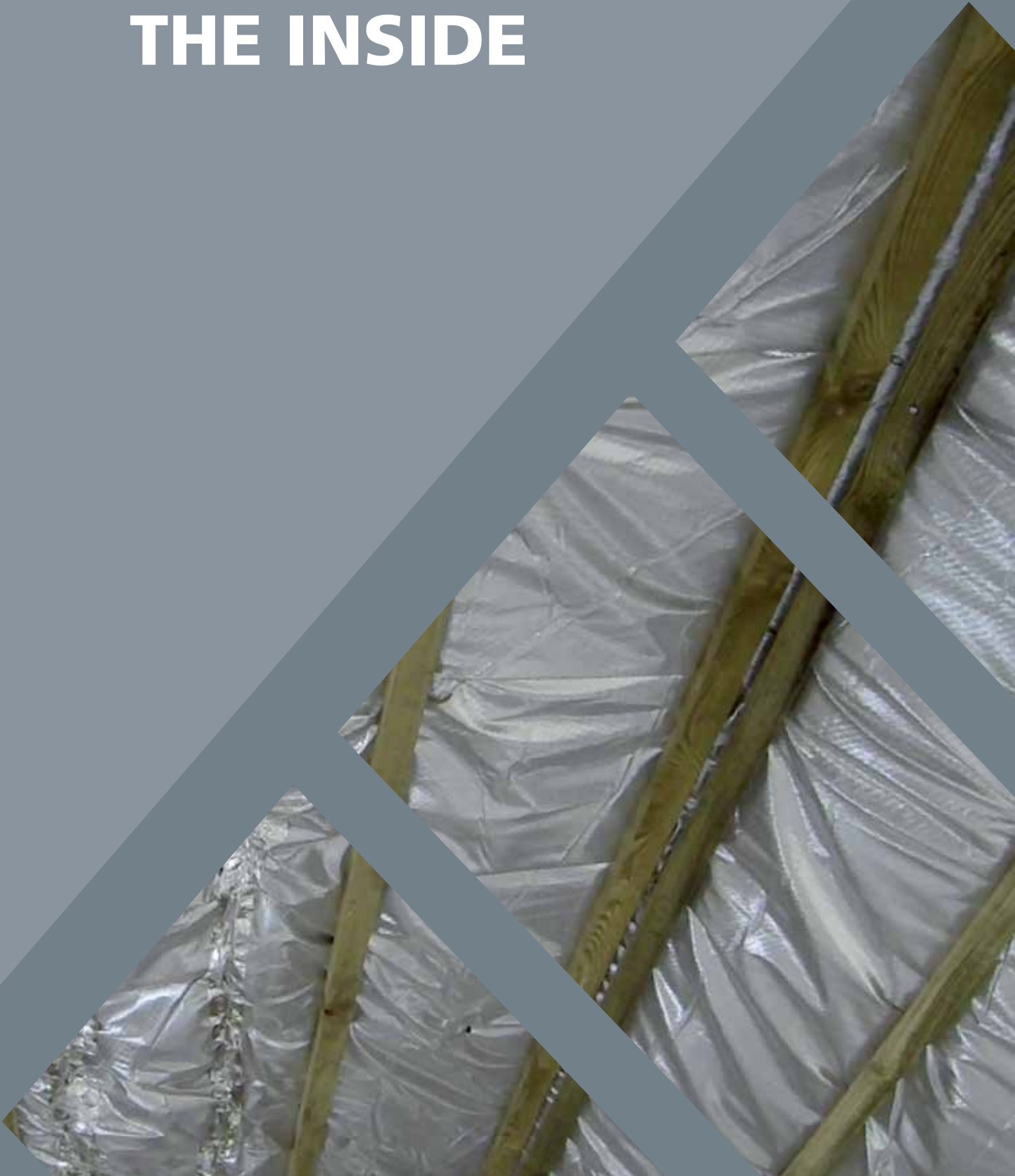
|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 110                         | 190               | 130                         | 210               | 145                         | 225               | 175                         | 255               |
| Rafter Centres 600 mm | 100                         | 180               | 115                         | 195               | 125                         | 205               | 150                         | 230               |



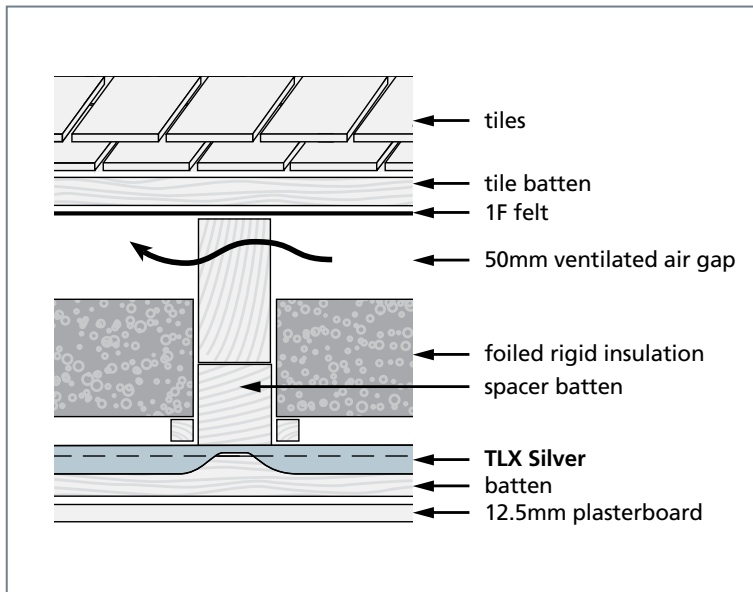
**SILVER** <sup>2<sub>IN</sub>1</sup>

INSULATING VAPOUR BARRIER

# WORKING FROM THE INSIDE



## TLX Silver below rafter, rigid board between rafter, 1F



### ROOFS WITH 1F NON-BREATHABLE FELT, CLOSED BOARDS OR NO FELT

The rafters may need battening out to greater depth in order to accommodate the amount of insulation required. Rigid insulation board such as PIR or Phenolic board is fitted between the rafters, ensuring there is a 50mm ventilated space above, and a 30mm space below the board. Boards can be held in place with small timber battens, clips or other fixings. Sealing the gap between the side of the board and the rafter is recommended to prevent air movement. TLX Silver is fitted across the bottom of the rafters. Each layer should overlap the previous layer by 50mm, and the overlap sealed with a suitable tape. TLX Silver is held in place with 38mm timber battens and a sheet of 12.5mm plasterboard added.

TLX Silver is a vapour barrier. This structure gives no risk of surface or interstitial condensation.

The depth of rigid insulation needed will depend on the rafter spacing and the type of board used. Phenolic board has a lower thermal conductivity than polyisocyanurate (PIR), and will generally save 5 - 10 mm of space.

### TLX Silver below rafters, 1F felt with Phenolic Foam ( $\lambda 0.020$ ), 38mm batten

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 90                          | 170               | 110                         | 190               | 120                         | 200               | 150                         | 230               |
| Rafter Centres 600 mm | 80                          | 160               | 100                         | 180               | 105                         | 185               | 130                         | 210               |

### TLX Silver below rafters, 1F felt with PIR ( $\lambda 0.022$ ), 38mm batten

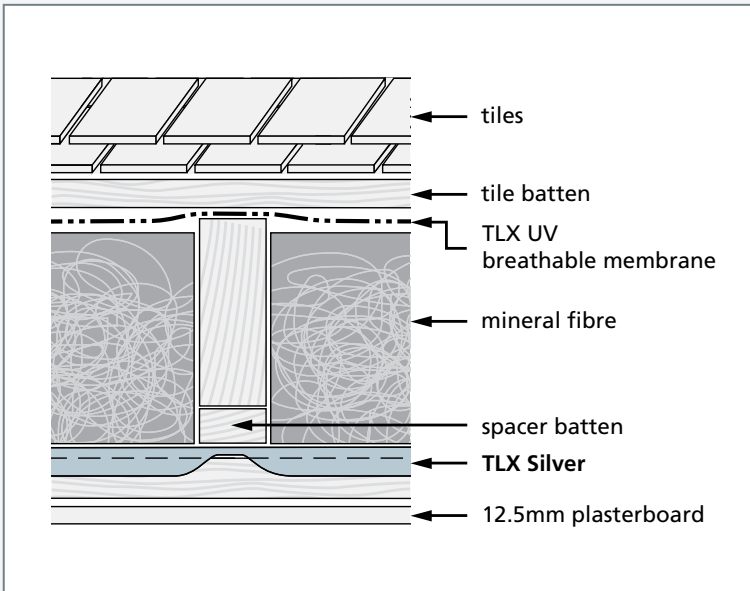
|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 100                         | 180               | 120                         | 200               | 130                         | 210               | 160                         | 240               |
| Rafter Centres 600 mm | 85                          | 165               | 105                         | 185               | 115                         | 195               | 145                         | 225               |



## ROOFS WITH BREATHABLE UNDERLAY

Where a breathable roofing underlay is fitted, the entire rafter space can be fully filled with insulation. Deep rafters of 150mm or above can use mineral wool whereas shallower rafters will require rigid board.

### TLX Silver below rafter, mineral wool between rafter, breather membrane



Fit the required thickness of mineral wool between the rafters. When pushing fibre in from underneath, the rafter space should not be completely filled to ensure that the breather membrane retains a minimum of a 10mm drape. This is to provide a channel for water penetrating the roof covering to run down to the gutter, and also to allow air movement up and down the roof. If the breather membrane does not drape at least 10mm, then counter battens above the membrane are required. TLX Silver is fitted across the bottom of the rafters, held in place with 38mm timber battens, and a sheet of plasterboard added. It is not practical to design an unventilated air space between TLX Silver and mineral wool. TLX Silver is a vapour barrier. This structure gives no risk of surface or interstitial condensation.

The depth of mineral wool needed will depend on the rafter spacing and the density of fibre used. High density fibre with a thermal conductivity of 0.032 W/mK will give the smallest thickness, but may not be the most cost effective material.

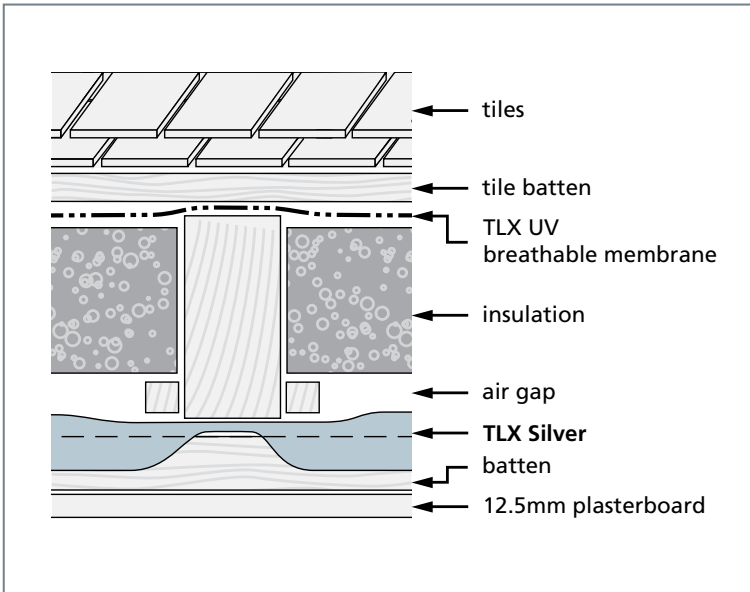
#### TLX Silver below rafters with Mineral Wool ( $\lambda 0.032$ ) between rafter, BM, 38mm batten

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 150                         | 175               | 175                         | 200               | 190                         | 225               | 230                         | 270               |
| Rafter Centres 600 mm | 140                         | 175               | 160                         | 200               | 175                         | 215               | 210                         | 250               |

#### TLX Silver below rafters with Mineral Wool ( $\lambda 0.035$ ) between rafter, BM, 38mm batten

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 160                         | 185               | 190                         | 220               | 200                         | 240               | 245                         | 285               |
| Rafter Centres 600 mm | 150                         | 175               | 175                         | 200               | 185                         | 225               | 225                         | 265               |

## TLX Silver below rafter, rigid board between rafter, breather membrane



The rafters may need battening out to greater depth in order to accommodate the amount of insulation required. Rigid insulation board such as PIR or Phenolic board is fitted between the rafters. Boards can be held in place with small timber battens, clips or other fixings. TLX Silver is fitted across the bottom of the rafters, held in place with 38mm timber battens, and a sheet of plasterboard added.

TLX Silver is a vapour barrier. This structure gives no risk of surface or interstitial condensation.

The depth of rigid insulation needed will depend on the rafter spacing and the type of board used. Phenolic board has a lower thermal conductivity than polyisocyanurate (PIR), and will generally require around 5 - 10mm less to give an equivalent U value.

### TLX Silver below rafters, Phenolic Foam ( $\lambda 0.020$ ) between rafter, BM, 38mm batten

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 80                          | 120               | 100                         | 140               | 110                         | 170               | 140                         | 200               |
| Rafter Centres 600 mm | 70                          | 110               | 90                          | 130               | 100                         | 160               | 125                         | 185               |

### TLX Silver below rafters, PIR ( $\lambda 0.022$ ) between rafter, BM, 38mm batten

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 85                          | 125               | 100                         | 150               | 115                         | 175               | 150                         | 210               |
| Rafter Centres 600 mm | 75                          | 115               | 90                          | 130               | 105                         | 165               | 130                         | 190               |

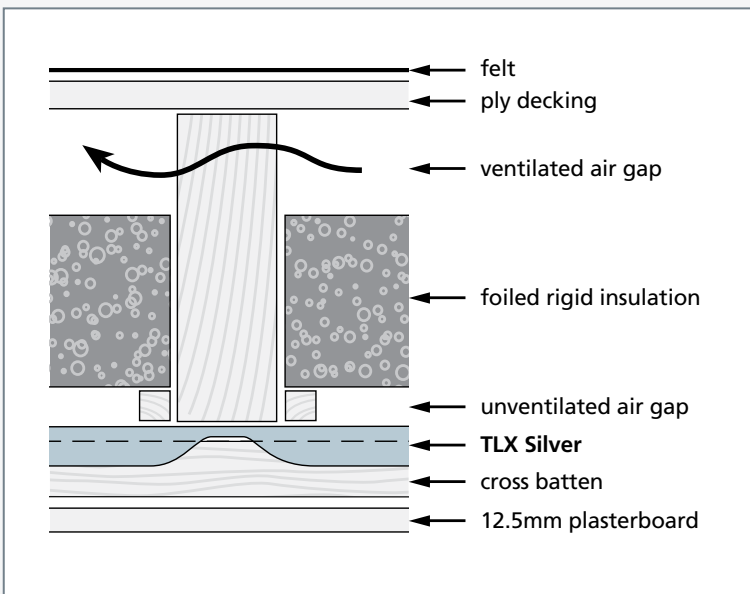
# FLAT ROOF

## COLD DECK

The more traditional flat roof system is to install the insulation between and under the joists, with ventilation below the timber deck. TLX Silver can be used to reduce the thickness of additional insulation required between the joists to help ensure a ventilated gap is maintained between the insulation and the deck.

TLX Silver is a vapour barrier, and this structure gives no risk of surface or interstitial condensation.

### TLX Silver below joist, rigid insulation between joist



The most effective way to alter the U value is to vary the thickness of rigid insulation. However, maintaining the air cavities is critical and reducing the depth of any cavities to below 20mm to allow for more rigid insulation is unlikely to improve the U value.

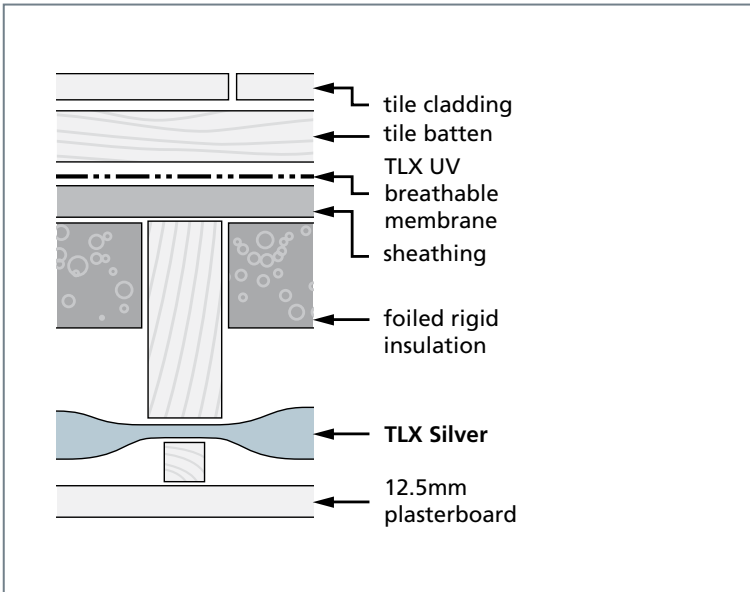
#### TLX Silver below joists, Phenolic Foam ( $\lambda 0.020$ ) between joists, 38mm batten

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 90                          | 170               | 110                         | 190               | 120                         | 200               | 150                         | 230               |
| Rafter Centres 600 mm | 80                          | 160               | 100                         | 180               | 110                         | 190               | 135                         | 235               |

#### TLX Silver below joists, PIR ( $\lambda 0.022$ ) between joists, 38mm batten

|                       | U = 0.18 W/m <sup>2</sup> K |                   | U = 0.16 W/m <sup>2</sup> K |                   | U = 0.15 W/m <sup>2</sup> K |                   | U = 0.13 W/m <sup>2</sup> K |                   |
|-----------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|
|                       | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) | Insulation Thickness (mm)   | Rafter Depth (mm) |
| Rafter Centres 400 mm | 100                         | 180               | 120                         | 200               | 130                         | 210               | 160                         | 240               |
| Rafter Centres 600 mm | 85                          | 165               | 110                         | 185               | 115                         | 195               | 145                         | 225               |

## Dormer Cheeks



The cheeks of a dormer are generally of a new build timber frame construction. Timber studs give the strength to the wall, with sheathing board and breather membrane outside to ensure rigidity and water tightness. The outer cladding may be tiles, slates or weatherboarding.

TLX Silver is installed across the face of the studs to provide thermal insulation and an air and vapour barrier. Additional insulation is fitted between the studs.

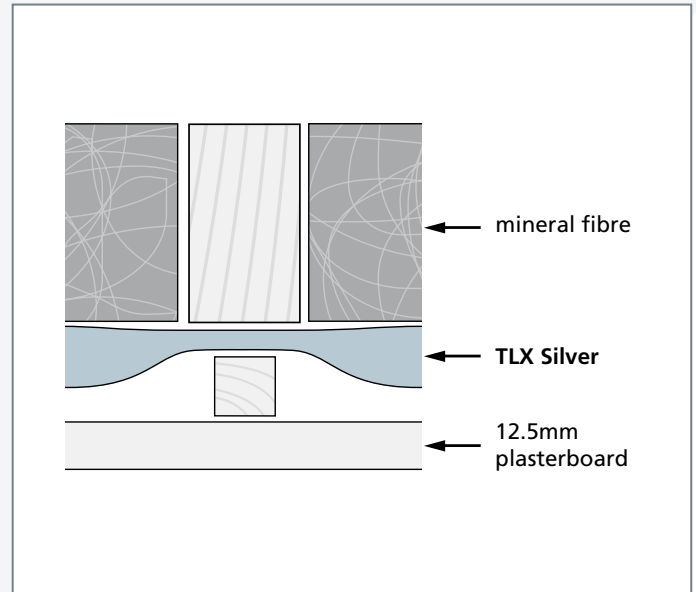
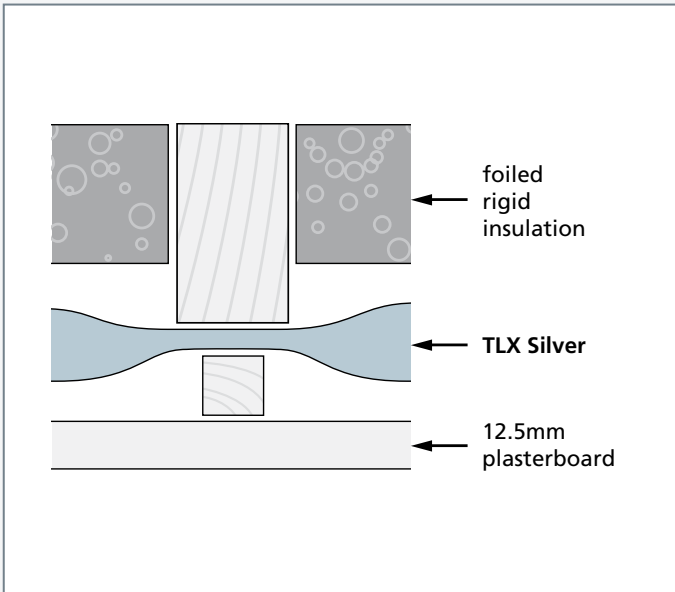
### TLX Silver in dormer cheeks, PIR ( $\lambda 0.022$ ), 38mm batten

|                        | U = 0.28 W/m <sup>2</sup> K |                 | U = 0.21 W/m <sup>2</sup> K |                 |
|------------------------|-----------------------------|-----------------|-----------------------------|-----------------|
|                        | Insulation Thickness (mm)   | Stud Depth (mm) | Insulation Thickness (mm)   | Stud Depth (mm) |
| TLX Silver Inside Stud | 35                          | 60              | 75                          | 110             |

### TLX Silver in dormer cheeks with Mineral Wool ( $\lambda 0.032$ ), 38mm batten

|                        | U = 0.28 W/m <sup>2</sup> K |                 | U = 0.21 W/m <sup>2</sup> K |                 |
|------------------------|-----------------------------|-----------------|-----------------------------|-----------------|
|                        | Insulation Thickness (mm)   | Stud Depth (mm) | Insulation Thickness (mm)   | Stud Depth (mm) |
| TLX Silver Inside Stud | 50                          | 75              | 120                         | 120             |

## Dwarf Wall



It is recommended that insulation and vapour control should follow the roof line from ridge to eaves. However, sometimes it may be necessary to insulate down the dwarf wall and across the ceiling.

Insulation is fitted between the timber studs that make up the dwarf wall, and TLX Silver installed across the front of the studs. A 38mm batten is used to hold the TLX Silver in place and to provide a small unventilated cavity. This cavity may be used for services such as cabling if desired.

### TLX Silver in dwarf wall, PIR ( $\lambda 0.022$ ), 38mm batten

|                        | U = 0.28 W/m <sup>2</sup> K |                 | U = 0.21 W/m <sup>2</sup> K |                 |
|------------------------|-----------------------------|-----------------|-----------------------------|-----------------|
|                        | Insulation Thickness (mm)   | Stud Depth (mm) | Insulation Thickness (mm)   | Stud Depth (mm) |
| TLX Silver inside stud | 35                          | 60              | 65                          | 100             |

### TLX Silver in dwarf wall with Mineral Wool ( $\lambda 0.032$ ), 38mm batten

|                        | U = 0.28 W/m <sup>2</sup> K |                 | U = 0.21 W/m <sup>2</sup> K |                 |
|------------------------|-----------------------------|-----------------|-----------------------------|-----------------|
|                        | Insulation Thickness (mm)   | Stud Depth (mm) | Insulation Thickness (mm)   | Stud Depth (mm) |
| TLX Silver inside stud | 50                          | 50              | 110                         | 110             |

## Timber frame walls

### A TIMBER FRAME WALL GENERALLY HAS THE STRUCTURE:

- Plasterboard
- Battens to create service cavity (optional)
- Insulation across front of studs (optional)
- Vapour control layer
- Timber studs containing insulation
- Sheathing board
- Breather membrane (standard or reflective)
- Cavity
- Outer cladding – brick, tiles, timber boarding

Standard timber stud depths are 89, 140 and 184mm. When calculating U values of stud walls, the timber fraction in the wall is normally taken as 15% to allow for studs, cross pieces, noggins, window and door frames and extra timber used to strengthen areas of the frame. To improve thermal performance, studs in the form of an I-beam may be used, or a twin frame system, where the timber bridging of the insulation is significantly reduced.

### TLX Silver in timber frame walls

TLX Silver is installed across the front face of the timber studs, providing both thermal resistance and a vapour barrier. Battens are fixed through TLX Silver to the studs to hold it securely in place and provide a cavity for services. A wall structure with TLX Silver fitted in this way has no risk of surface or interstitial condensation.

To minimise joints in the vapour barrier, TLX Silver is available in widths up to 3.0m

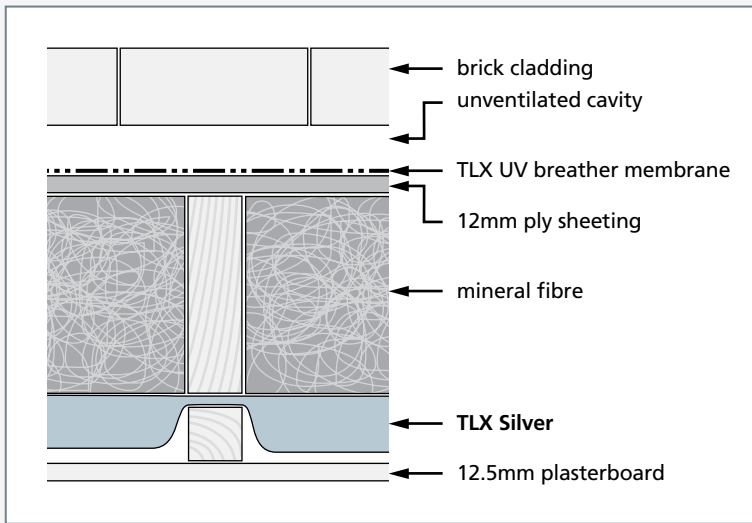
A breather membrane on the outside of the sheathing board ensures the frame is watertight. This membrane can be a standard or a reflective, low emissivity product. The cavity between the breather membrane and brick cladding can be considered as an unventilated cavity. The thermal resistance of the cavity is:

|                              | Unventilated Cavity |                      |
|------------------------------|---------------------|----------------------|
|                              | Emissivity (ε)      | R <sub>e</sub> value |
| Standard breather membrane   | 0.90                | 0.184                |
| Reflective breather membrane | 0.05                | 0.665                |

The cavity between the breather membrane and tile or weatherboard cladding is considered to be ventilated. The thermal resistance of the cavity is taken as zero. However, there is still a slight advantage to using a reflective breather membrane, since the outside surface resistance of the wall is increased:

|                              | Ventilated Cavity |                      |
|------------------------------|-------------------|----------------------|
|                              | Emissivity (ε)    | R <sub>e</sub> value |
| Standard breather membrane   | 0.90              | 0.130                |
| Reflective breather membrane | 0.05              | 0.290                |

## Timber frame walls with TLX Silver and mineral wool



Fully fill stud cavity with mineral wool to prevent slumping.

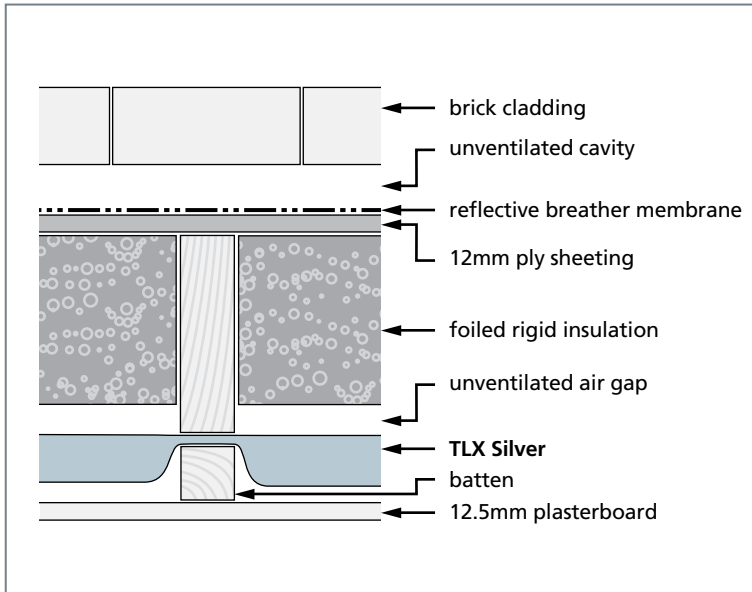
### Timber frame wall, reflective breather membrane $\epsilon$ 0.05, 38mm batten

|                   | U value W/m <sup>2</sup> K           |                 |                 |                 |                 |                 |
|-------------------|--------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                   | Thermal conductivity of mineral wool |                 |                 |                 |                 |                 |
|                   | $\lambda$ 0.032                      |                 | $\lambda$ 0.035 |                 | $\lambda$ 0.040 |                 |
|                   | Brick Cladding                       | Timber Cladding | Brick Cladding  | Timber Cladding | Brick Cladding  | Timber Cladding |
| Stud Depth 89 mm  | 0.23                                 | 0.26            | 0.23            | 0.27            | 0.24            | 0.28            |
| Stud Depth 140 mm | 0.18                                 | 0.20            | 0.19            | 0.21            | 0.20            | 0.22            |
| Stud Depth 184 mm | 0.15                                 | 0.17            | 0.16            | 0.17            | 0.17            | 0.19            |

### Timber frame wall, standard breather membrane $\epsilon$ 0.90, 38mm batten

|                   | U value W/m <sup>2</sup> K           |                 |                 |                 |                 |                 |
|-------------------|--------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                   | Thermal conductivity of mineral wool |                 |                 |                 |                 |                 |
|                   | $\lambda$ 0.032                      |                 | $\lambda$ 0.035 |                 | $\lambda$ 0.040 |                 |
|                   | Brick Cladding                       | Timber Cladding | Brick Cladding  | Timber Cladding | Brick Cladding  | Timber Cladding |
| Stud Depth 89 mm  | 0.26                                 | 0.27            | 0.26            | 0.28            | 0.28            | 0.30            |
| Stud Depth 140 mm | 0.20                                 | 0.21            | 0.21            | 0.22            | 0.22            | 0.23            |
| Stud Depth 184 mm | 0.17                                 | 0.17            | 0.17            | 0.18            | 0.18            | 0.19            |

## Timber frame walls with TLX Silver and rigid insulation board



The thickness of rigid board is 20mm less than the stud depth, allowing an unventilated air cavity to form between the board and TLX Silver inside the studs.

### Timber frame wall, reflective breather membrane, 38mm batten

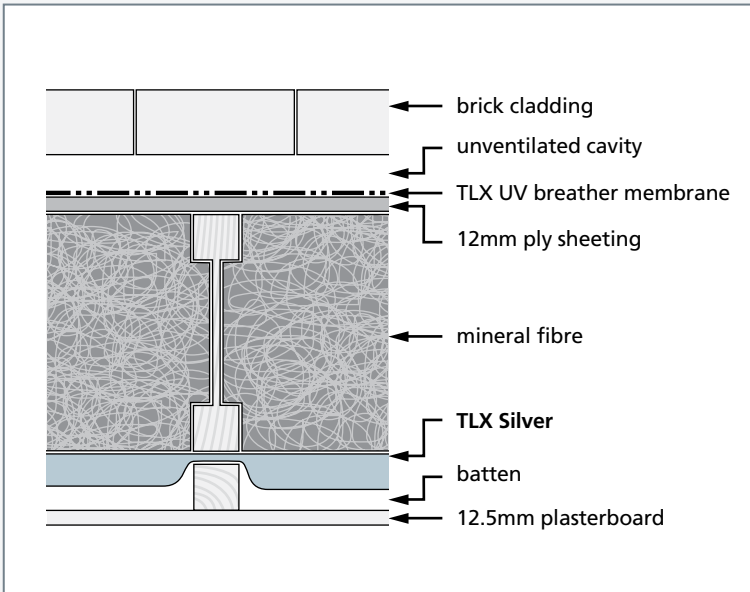
|                      |                                    | U value W/m <sup>2</sup> K  |                 |                        |                 |
|----------------------|------------------------------------|-----------------------------|-----------------|------------------------|-----------------|
|                      |                                    | Board thermal conductivity  |                 |                        |                 |
|                      |                                    | Phenolic<br>$\lambda$ 0.020 |                 | PIR<br>$\lambda$ 0.022 |                 |
|                      |                                    | Brick Cladding              | Timber Cladding | Brick Cladding         | Timber Cladding |
| Stud Depth<br>89 mm  | Insulation Thickness<br>(mm)<br>70 | 0.19                        | 0.21            | 0.19                   | 0.22            |
| Stud Depth<br>140 mm | 120                                | 0.14                        | 0.16            | 0.15                   | 0.16            |
| Stud Depth<br>184 mm | 160                                | 0.12                        | 0.13            | 0.13                   | 0.14            |

### Timber frame wall, standard breather membrane, 38mm batten

|                      |                                    | U value W/m <sup>2</sup> K  |                 |                        |                 |
|----------------------|------------------------------------|-----------------------------|-----------------|------------------------|-----------------|
|                      |                                    | Board thermal conductivity  |                 |                        |                 |
|                      |                                    | Phenolic<br>$\lambda$ 0.020 |                 | PIR<br>$\lambda$ 0.022 |                 |
|                      |                                    | Brick Cladding              | Timber Cladding | Brick Cladding         | Timber Cladding |
| Stud Depth<br>89 mm  | Insulation Thickness<br>(mm)<br>70 | 0.21                        | 0.22            | 0.21                   | 0.23            |
| Stud Depth<br>140 mm | 120                                | 0.16                        | 0.16            | 0.16                   | 0.17            |
| Stud Depth<br>184 mm | 160                                | 0.13                        | 0.14            | 0.14                   | 0.14            |



## I-beam studs

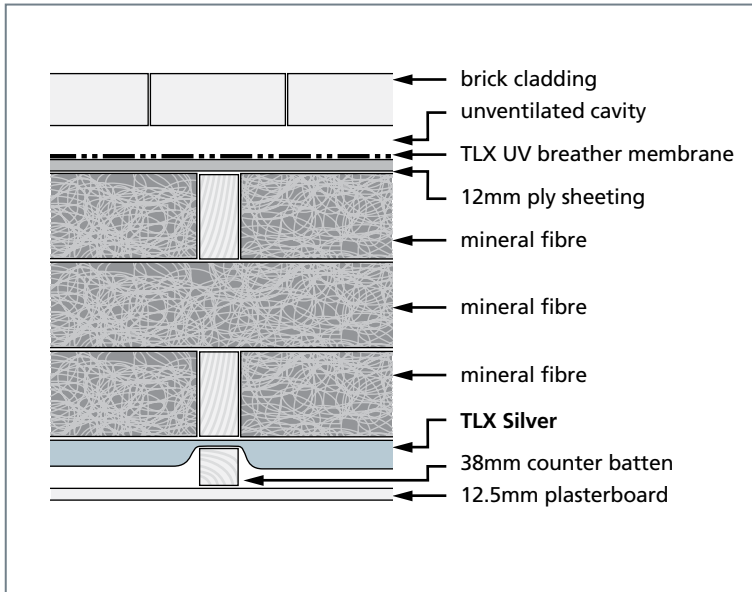


I-beam studs consist of two outer flanges held together by a thinner web. This introduces less timber bridging of the insulation between the studs and leads to lower U values. The flange is generally 39mm deep and 38- 89mm wide and the web is 10mm wide. The total depth of the I-stud is 140, 200, 240, 300mm.

### Timber frame wall, standard breather membrane $\epsilon$ 0.90, brick cladding, 38mm batten

| I Beam Depth (mm) | U value W/m <sup>2</sup> K           |                 |
|-------------------|--------------------------------------|-----------------|
|                   | Thermal conductivity of mineral wool |                 |
|                   | $\lambda$ 0.032                      | $\lambda$ 0.035 |
| 140               | 0.18                                 | 0.19            |
| 200               | 0.14                                 | 0.15            |
| 240               | 0.12                                 | 0.13            |
| 300               | 0.10                                 | 0.11            |

## Timber frame walls with split studs

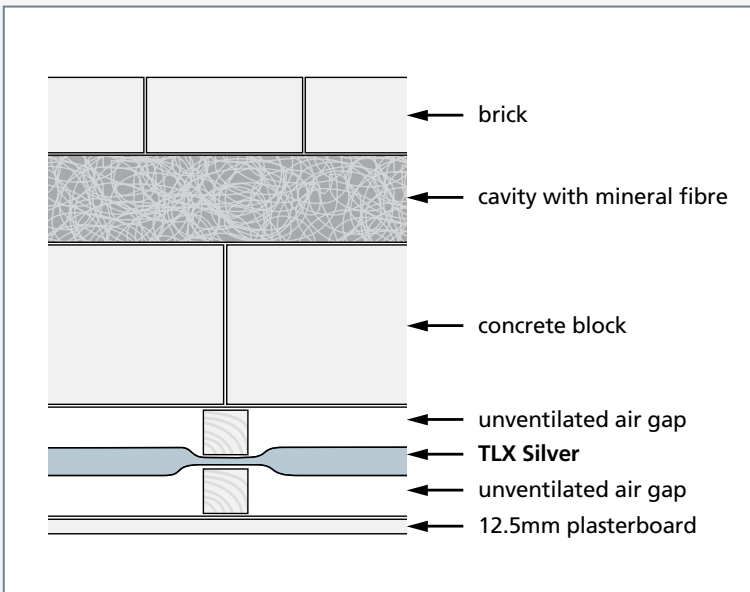


Split studs or twin frame is another way to reduce timber bridging of the insulation. The central layer of insulation is effectively unbridged by timber.

**Timber frame wall, standard breather membrane  
ε 0.90, brick cladding, 38mm batten**

|                  |          |                 | U values W/m <sup>2</sup> K          |         |
|------------------|----------|-----------------|--------------------------------------|---------|
|                  |          |                 | Thermal conductivity of mineral wool |         |
| Outer Depth (mm) | Gap (mm) | Inner Stud (mm) | λ 0.032                              | λ 0.035 |
| 90               | 90       | 90              | 0.11                                 | 0.12    |
| 90               | 120      | 90              | 0.10                                 | 0.11    |

## Masonry cavity walls



Masonry cavity walls are a traditional and widely used method of building walls. The cavity can be fully filled with insulation, either fitted or injected, or partially filled to leave a clear cavity.

TLX Silver can be installed to the interior of cavity masonry walls on timber studs or battens fixed to the inner leaf of the wall. Additional insulation may be fitted between the studs to lower the U value of the wall. A second set of battens holds the TLX Silver in place and provides a service cavity.

It is unlikely that a new build cavity wall would require internal insulation, since it is more effective to insulate inside the cavity. However, TLX Silver may be used to upgrade the thermal performance of existing cavity walls. For example, the wall:

1. 105mm brick
2. 100mm cavity injected with mineral wool  
0.040 W/mK
3. 100mm dense concrete block
4. 12.5mm plasterboard on 15mm plaster dabs

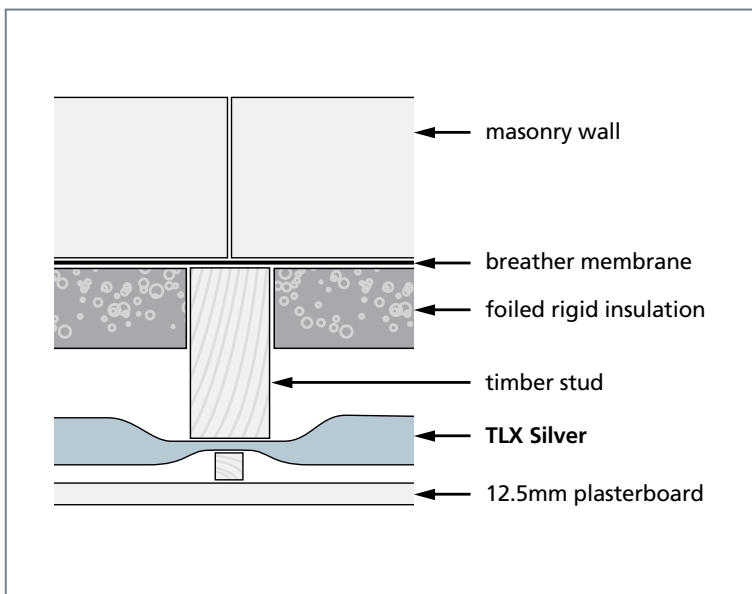
has a U value of 0.35 W/m<sup>2</sup>K.

Removing the existing plasterboard and replacing it with 25mm studs, TLX Silver, 25mm battens and 12.5mm plasterboard reduces the U value to 0.24 W/m<sup>2</sup>K and only takes up an additional 37mm of space.

## SOLID MASONRY WALLS

Upgrading the insulation of solid masonry walls represents a real challenge to improving the energy efficiency of housing stock. In many cases, external insulation would alter the appearance of the building and may not be acceptable. Internal lining of solid walls is sometimes the only way to upgrade solid walls.

### Masonry wall with TLX Silver



TLX Silver can be installed to the interior of cavity masonry walls, on timber studs or battens fixed to the inner leaf of the wall. A breathable membrane should be fitted between the inner leaf of the masonry and any timber studs or battens. Additional insulation may be fitted between the studs to lower the U value of the wall. A second set of battens holds the TLX Silver in place and provides a service cavity.

TLX Silver helps to improve the airtightness of existing houses, and prevents condensation inside the wall.

#### TLX Silver on inside, 9" masonry walls, 38mm batten

| Stud Depth (mm) | Batten Depth (mm) | Insulation Depth (mm) | U values W/m <sup>2</sup> K |                         |                         |
|-----------------|-------------------|-----------------------|-----------------------------|-------------------------|-------------------------|
|                 |                   |                       | PIR<br>λ 0.022              | Mineral Wool<br>λ 0.032 | Mineral Wool<br>λ 0.037 |
| 25              | 25                | 0                     | 0.47                        | 0.47                    | 0.47                    |
| 50              | 25                | 25                    | 0.33                        | 0.36                    | 0.37                    |
| 50              | 38                | 40                    | 0.28                        | 0.32                    | 0.33                    |

# APPROVED DOCUMENT PART L1B REQUIREMENTS

## U values needed

The Building Regulations changed in October 2010, and the U values required for different elements of a building were improved. The U values required in both the 2006 and the 2010 regulations are shown below.

## New thermal elements - extensions

This would apply to a new dormer construction, and also to a new gable wall built as part of a hip-to-gable conversion. The regulations governing Wales were further updated in July 2014 for new thermal elements and are shown in the table below.

| New thermal elements                      | U value W/m <sup>2</sup> K |           |                        |
|-------------------------------------------|----------------------------|-----------|------------------------|
|                                           | Year 2006                  | Year 2010 | Year 2014 (Wales Only) |
| Wall                                      | 0.30                       | 0.28      | 0.21                   |
| Pitched roof - insulation at rafter level | 0.20                       | 0.18      | 0.15                   |
| Flat roof                                 | 0.20                       | 0.18      | 0.15                   |
| Floor                                     | 0.22                       | 0.22      | 0.18                   |

## Retained thermal elements - conversions and upgrades

This applies to existing gable walls and pitched roofs that previously were not insulated, but as a result of the loft conversion become part of the insulated envelope. If the U value of the existing element does not meet the Part L1B threshold value given in the table, they must be upgraded to the improved value.

| New thermal elements                      | U value W/m <sup>2</sup> K |                          |                          |
|-------------------------------------------|----------------------------|--------------------------|--------------------------|
|                                           | Threshold value            | Year 2006 Improved value | Year 2010 Improved value |
| Cavity Wall                               | 0.70                       | 0.55                     | 0.55                     |
| Wall                                      | 0.70                       | 0.35                     | 0.30                     |
| Pitched roof - insulation at rafter level | 0.35                       | 0.20                     | 0.18                     |
| Flat roof                                 | 0.35                       | 0.25                     | 0.18                     |
| Floor                                     | 0.70                       | 0.25                     | 0.25                     |

# U VALUE & CONDENSATION RISK CALCULATIONS

All U values have been calculated using the Combined Method, as defined in BS EN ISO 6946.

The physical properties of TLX products have been measured by accredited laboratories according to BS or ISO test methods. In particular the thermal resistances of TLX products have been measured using both the guarded hot plate (BS EN 12667) and the guarded hot box test (BS EN ISO 8990) methods.

The thicknesses and thermal properties of insulation materials such as mineral wool and rigid board have been taken from manufacturers' declared values, supported by certificates issued by an accredited certification body. Manufacturers' declared property values have been used for structural materials such as timber, plasterboard and masonry.

The thermal resistance of unventilated air spaces in roofs has been calculated using the detailed method defined in ISO15099. This calculates the thermal resistance of an airspace based on orientation (vertical, horizontal), thickness, emissivity of surfaces, average temperature and temperature drop across the cavity.

Condensation risk analysis has followed the Glaser calculation method in BS EN ISO 13788.

The vapour resistances of materials have again used manufacturers' declared values.

It must be stressed that both the U value and condensation risk calculations are specific to the structures and materials used. If the TLX product described is substituted for an alternative, then the calculation will no longer be valid. This is particularly important where the risk of damaging interstitial condensation is involved. The structures in this guide have all been assessed as having no risk of interstitial or surface condensation, but if materials are substituted for alternatives then the calculations will no longer be valid. Particular attention should be paid to multi-foil materials that are stitched and have holes which penetrate the material, or which claim to be breathable but do not have the same properties as TLX Gold.

Condensation risk analyses assume that movement of water vapour occurs by diffusion through materials, and not by movement of moist air through gaps in the structure. The ceiling should therefore be well sealed, as defined in BS5250, to prevent excessive amounts of water vapour entering the roof structure.

- Sheets of plasterboard should be fitted as close together as possible, and the joints sealed with tape or with mastic.
- Gaps around penetrations such as wiring or pipes should also be filled with sealant.
- Junctions of the roof and wall must be sealed.
- Access hatches and frames should be fitted with seals to minimise air leakage. Hatches should not be located in bathrooms or kitchens where large amounts of moisture are produced.
- Recessed light fittings should be designed to reduce air leakage with suitable sealed hood or box if necessary.
- The head of any wall or partition cavity should be sealed.

Where this cannot be achieved a vapour control layer should be provided below the insulation.

There must be adequate ventilation in the air space between the breather membrane or TLX Gold and the outer roof covering to remove any water vapour passing into that space.

Some outer coverings are air open and do not require additional ventilation. Clay or concrete tiles and natural slates are considered air open.

Other roof coverings such as synthetic slates, fibre cement slates and metal roof coverings are not air-open. If this type of roof covering is used, additional ventilation at eaves and ridge must be provided.

# GENERAL INSTALLATION INSTRUCTIONS

## General Installation Procedures

---

- Protective clothing is not required when handling the TLX product range.
- Bare electrical wiring must not be allowed in contact with TLX. PVC coated electrical wiring to normal domestic items such as light fittings may come into contact with TLX.
- If electrical cables are surrounded by insulation they may need to be de-rated and guidance should be sought from a qualified electrician.

## Installation Procedures

---

### TLX SILVER

- TLX Silver may be installed either face up.
- TLX Silver is unrolled below the rafters in horizontal layers, parallel to the eaves. The product should be installed from ridge to eaves, and over- or under-lapped to ensure that any water inside the rafter space runs down and does not penetrate the insulation or the rafter space. As the TLX Silver is unrolled across the rafters it is fixed in place using nails or staples of at least 14mm depth. The next roll of Silver must overlap the preceding layer by at least 50mm, and the overlap should be sealed along the entire length using the specified adhesive tape.
- When installing TLX Silver, try to retain the full width (with two seams) whenever possible. For the bottom layer, it is better to use a complete layer, and increase the overlap with the next layer up, rather than cutting along the Silver to maintain a 50mm overlap.
- TLX Silver should be permanently held in place using wooden battens fixed with nails. Battens may run either parallel or perpendicular to the rafters.
- A breathable roofing membrane is fitted above the rafters following the manufacturer's instructions. Tiling battens and tiles are then fitted.

## TLX for walls

---

- TLX Silver for walls may be installed either face up.
- Installation may be either vertical or horizontal. If horizontal, installation should start at the floor and go up to the ceiling.
- The product is unrolled across the inside of the timber studs and fixed using staples or nails of at least 14mm length.
- The next layer must overlap the first layer by at least 50mm and be taped along the entire length of the joint with a suitable tape. If securely taped, the product will also function as a vapour barrier.
- The product should be permanently fixed in place using wooden battens of at least 38 x 25mm, perpendicular to the wall studs and held in place with nails. When the top layer has been battened and any excess material may be removed by running a sharp knife along the edge of the batten.
- Plasterboard is fixed to the battens. The batten size should be sufficient to ensure a 20mm gap between the product and the plasterboard. This gap may be used as a cavity for services.

## Solid masonry wall

---

- Fit vertical timber studs of at least 38 x 25mm down the wall and fix in place with screws. The product is unrolled across the inside of the timber studs and fixed using staples or nails of at least 14mm length.
- The next layer must overlap the first layer by at least 50mm and be taped along the entire length of the joint with suitable tape.
- The product should be permanently fixed in place using wooden battens of at least 38 x 25mm, perpendicular to the wall studs held in place with nails.
- When the top layer has been battened, any excess material may be removed by running a sharp knife along the edge of the batten.

# GENERAL INSTALLATION INSTRUCTIONS

## Installation Procedures

---

### TLX GOLD

- These installation instructions assume uniform rafter centres of 400mm or 600mm and that any battening applied to the roof is of a suitable size to avoid movement or rocking of the battens over the top of the TLX Gold. If these assumptions do not apply, the TLX Hotline (01204 674730) should be contacted for advice.

### TLX Gold – Installation WITHOUT counter battening

---

- The right hand side of TLX Gold is fitted in place with nails or staples of at least 20mm. The TLX Gold is then unrolled across the rafters. The TLX Gold should sag between each rafter centre so that when the tiling battens are fitted there is a clear 10mm channel formed between the underside of the tile batten and the TLX Gold to allow for water runoff and air movement.
- Side laps at the end of runs are created by separating the breather membrane layer from the rest of the product. The insulation layers are then cut back to the last rafter that the material has crossed. A new roll is then laid from where the cut back material ends. The created membrane flap then laps onto the new roll and is sealed with a suitable tape to create a watertight finish.
- Each layer of TLX Gold must butt-join the previous layer, with the membrane overlap running onto the lower layer, thus ensuring that any water runs down the roof slope without penetrating between layers. The overlap is then sealed by removing the release paper from the integral tape on the TLX Gold and bringing the lap in contact with the lower layer. The drape should be consistent for each layer of TLX Gold.
- A 10mm channel should run above the TLX Gold, up the centre of each rafter space, to allow water to run down and for air movement. If a clear channel is not formed, 10mm spacers underneath the tiling battens may be fitted.
- The membrane overlap on the bottom layer of TLX Gold should extend onto a suitable eaves carrier. TLX Gold should be sealed to the eaves protection system to avoid introducing air movement below the TLX Gold.

- TLX Gold is permanently held in place by tiling battens and tiles are fitted in accordance with BS5534. If there is any doubt about the water tightness at the fixing point, butyl tape or a bead of bitumen adhesive may be applied to give an improved seal.

### TLX Gold – Installation WITH counter battening

---

- The right hand side of TLX Gold is fitted in place with nails or staples of at least 20mm. TLX Gold is the unrolled tightly across the rafters parallel to the eaves.
- Side laps at the end of runs are created by separating the breather membrane layer from the rest of the product. The insulation layers are then cut back to the last rafter that the material has crossed. A new roll is then laid from where the cut back material ends. The created membrane flap then laps onto the new roll and is sealed with a suitable tape to create a watertight finish.
- The membrane overlap on the bottom layer of TLX Gold should extend onto a suitable eaves carrier. TLX Gold should be sealed to the eaves protection system to avoid introducing air movement below the TLX Gold.
- Each layer of TLX Gold must butt-join the previous layer, with the membrane overlap running onto the lower layer, thus ensuring that any water runs down the roof slope without penetrating between layers. The overlap is then sealed by removing the release paper from the integral tape on the TLX Gold and bringing the lap in contact with the lower layer. The drape should be consistent for each layer of TLX Gold.
- TLX Gold is permanently held in place with 38mm deep counter battens, then tiling battens and tiles are fitted in accordance with BS5534. If there is any doubt about the water tightness at the fixing point, butyl tape or a bead of bitumen adhesive may be applied to give an improved seal.



## Cutting

---

- TLX can be cut using a sharp knife with the TLX resting on a board, with sharp scissors or a hot knife.
- Pieces which have been cut should be stapled and battened as soon as possible, and should not be left unsecured overnight.
- Small pieces (such as around Velux windows or in dormer cheeks) should be taped in place, stapled and battened immediately.
- Any small tears or holes should be repaired with tape. Larger holes in the top layer of TLX Gold should be patched with a piece of breathable underlay.

## Taping

---

### TLX SILVER

- It is important that TLX Silver is securely taped at overlaps and junctions with walls or windows.
- TLX Silver must always be taped together when the surfaces are clean and dry.
- Short lengths of TLX Silver can be joined together with a suitable tape.

### TLX GOLD

- TLX Gold is supplied with an integral tape across the top length of the roll to seal the horizontal overlaps.
- Side laps of the material should be sealed using a high tack acrylic adhesive such as Gawler Airtight tape.

## Air layers

---

- Unventilated air layers form an important part of the TLX system. If the air spaces are omitted, whilst there is no danger of condensation, the overall thermal performance of the structure will decrease, and the U value will be higher. Additional insulation may be needed to achieve the desired U value for the roof.

## Additional insulation

---

- Install additional insulation according to the manufacturer's instructions.
- Provide for air gaps between TLX and additional insulation as required.

## Storage

---

- TLX rolls must be stored on a dry flat surface, protected from the weather and direct sunlight.
- Make sure when installing TLX that it does not come into contact with heat sources above 80°C.

## Vapour control and ventilation

---

### TLX SILVER

- Where TLX Silver is fitted below rafters it also performs as an effective vapour barrier, preventing water vapour from the house from penetrating the roof structure and possibly condensing on a cold surface. No additional vapour barrier is required.
- Ventilation of the rafter space is not needed if a breathable roofing membrane has been used. If a non-breathable (or 1F type) membrane is in place, then a 50mm ventilated air space beneath the felt is required.
- Ventilation of the space between the membrane and the outer roof covering is not required for air-open coverings such as clay or concrete tiles and natural slates.
- If in any doubt about possible harmful condensation, contact TLX Insulation Ltd for guidance.

# GENERAL INSTALLATION INSTRUCTIONS

## Vapour control and ventilation

---

### TLX GOLD

- A vapour control layer is not required for any of the recommended solutions, as using breathable products prevents trapping of water vapour.
- A well-sealed ceiling is essential to prevent large amounts of water vapour from entering the roof space through air movement.
- Ventilation of the space between the TLX Gold and the outer roof covering is not required for air-open coverings such as clay or concrete tiles and rough natural slates. Smooth fibre cement slates and sealed roof coverings such as metal roofs require additional ventilation of this space.
- If in any doubt about possible harmful condensation, contact TLX Insulation Ltd for guidance.

## Tape

---

- Taping the overlaps of TLX Silver is an important part of the overall system to ensure airtightness.
- It is preferred that tapes are silver reflective, but it is not essential since the area of tape is only a small proportion of the total roof.
- Tapes should be at least 50mm in width. Tape may or may not have a backing release paper.
- The adhesive used in the tape must bond strongly and quickly to the outer surface of TLX Silver. The tape must bond well at low temperatures, down to 0°C, if for example the TLX Silver is being installed on a cold winter's day. The tape must also maintain adhesion at temperatures up to 70°C. The strength of adhesion of the tape to TLX Silver must be at least 30 N / 50mm. Suitable adhesives may include solvent-based acrylic or butyl, or synthetic rubber. Water-based adhesives may not be suitable. If in doubt, consult TLX Insulation Ltd for advice.

- Suitable tapes include:

Gawler Single sided Airtight tape  
Gawler Double sided Airtight tape  
Henkel All-Purpose Duck tape  
Venture Tape 1507CW  
Unibond Power Tape

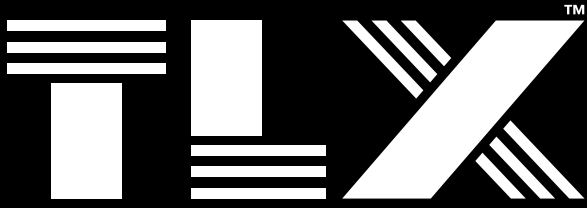
## Accessories

---

- For more information on suitable tapes, cutters and spacers please refer to [www.tlxinsulation.co.uk](http://www.tlxinsulation.co.uk) or phone the Thermal Hotline 01204 674 730 for advice.

# GLOSSARY

|                                   |                                                                                                                                                                   |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><math>\lambda</math> value</b> | Lambda value. Thermal conductivity (W/mK) relates to a material's ability to conduct heat. May also be expressed as k value.                                      |
| <b>R value</b>                    | Thermal resistance ( $m^2K/W$ ) is the measure of a material's ability to prevent heat transfer.                                                                  |
| <b>U value</b>                    | Thermal transmittance ( $W/m^2K$ ) is the rate at which heat is transferred through a structure.                                                                  |
| <b><math>\epsilon</math></b>      | Emissivity (expressed as e or $\epsilon$ ) is the ability of a surface to emit energy by radiation. The more reflective a surface is, the lower its emissivity.   |
| <b>1F</b>                         | Traditional non-breathable roofing felt, generally bitumen-based.                                                                                                 |
| <b>BM</b>                         | Breathable membrane can be used in place of a traditional 1F, felt, but unlike 1F breather membrane offers very little resistance to the passage of water vapour. |
| <b>VCL</b>                        | Vapour control layers are used on the warm side of a structure (typically installed directly behind plasterboard) to restrict the passage of water vapour.        |
| <b>PIR</b>                        | Polyisocyanurate insulation                                                                                                                                       |
| <b>PUR</b>                        | Polyurethane insulation                                                                                                                                           |



**INSULATION EXCELLENCE**

UK's leading manufacturer  
of thin, reflective insulation  
and breather membranes

TLX Insulation Ltd  
Moss Lane, Station Road  
Blackrod, Lancs BL6 5JB  
Telephone: +44 (0)1204 695666  
Fax: +44 (0)1204 695333

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

