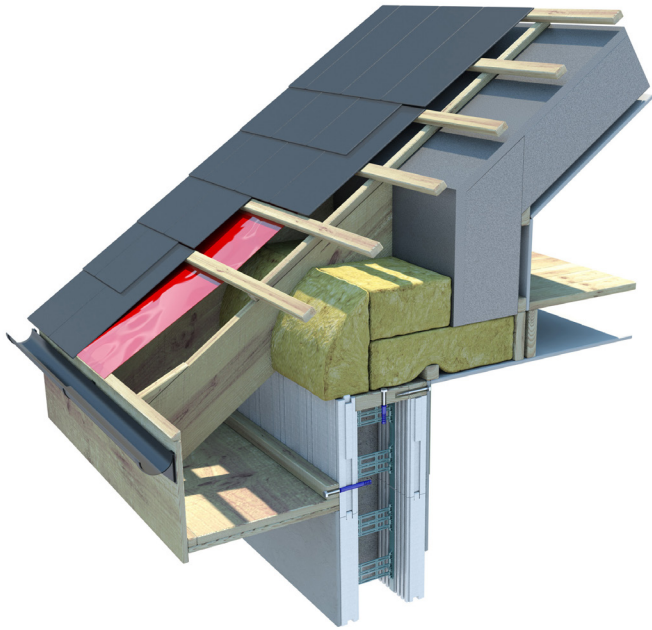


# KORE

## KORE Lock

### Roof Insulation Design Guide

# KORE Roof Insulation



## Key Features

- Meets and exceeds building regulations
- Excellent thermal properties
- Very simple and safe to install
- Variable width adjustment
- Facilitates necessary ventilation requirements
- Easy to work with and install

## Application & Description

### Application

KORE Lock is an insulation system for use in warm and cold pitched roofs. For warm pitched roof applications the KORE Lock Sheet is installed between the rafters, along with KORE Warmark board over the rafters. For cold pitched roof applications the KORE Lock Sheet is installed between the rafters, along with KORE Thermal Board on the underside of the rafters.

use of KORE Warmark for warm pitched roof applications and KORE Thermal Boards for cold pitched roof applications.

### Description

KORE Lock is a high performance expanded polystyrene insulation system that is very simple and safe to install. The system provides a completed tight fitting insulation envelope. The unique cut of the KORE Lock variable width panels allows the product to be compressed slightly for easy insertion between the rafters. Once in place, the KORE Lock panels return to their normal size and remain securely in place. Thermal bridges are limited through the

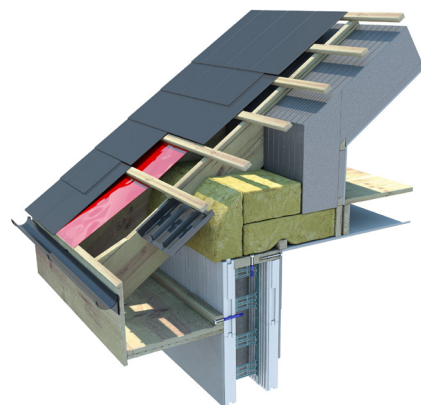
# Application & Description

## Product Name

Product Name	Application	New Build	Retrofitting*
KORE Lock EPS70 Silver	Cold Pitched Roof & Warm Pitched Roof	Yes	Yes
KORE Lock EPS70 White	Cold Pitched Roof & Warm Pitched Roof	Yes	Yes
KORE Warsark EPS100 Silver	Warm Pitched Roof	Yes	Yes
KORE Warsark EPS100 White	Warm Pitched Roof	Yes	Yes
KORE Thermal Board EPS70 Silver	Cold Pitched Roof	Yes	Yes
KORE Thermal Board EPS70 White	Cold Pitched Roof	Yes	Yes

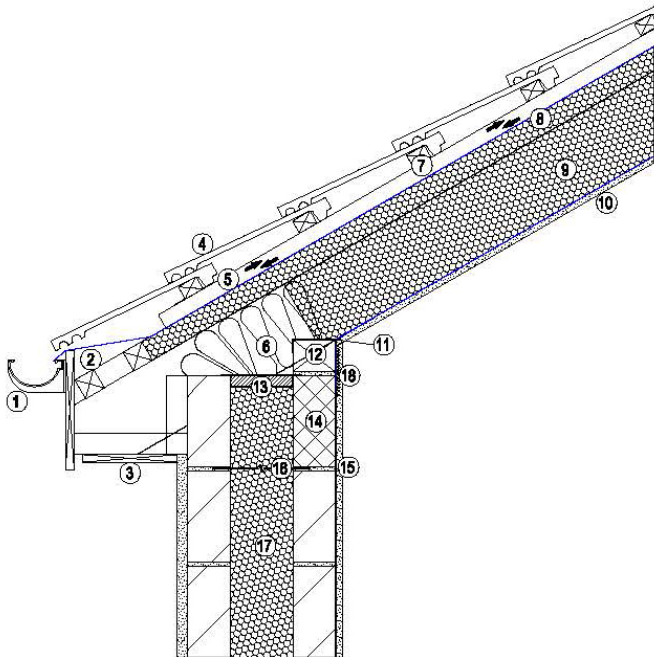
## Typical Construction and U-Value Calculations

All U-value calculations are in accordance with BS EN ISO 6946:2007. The calculations take account of fixings for both the warm roof and cold roof applications. The roof finish for all calculations were taken as clay roof tiles. The timber centres were taken as 400mm. Please contact our technical team for calculations at different centres. It is assumed that the insulation is fitted accordingly and the correction factor for air gaps has been ignored. All calculations take account all of the necessary ventilation. Warsark board is tongue and grooved.



# Typical Construction & U-Value Calculations

## Detail 1: Warm Pitched Roof - Insulation Between and Over Rafters (no sarking board)



1. Gutter
2. Tilting fillet/felt support to prevent ponding of felt at eaves level
3. Ventilated soffit
4. Tiled/slatted roof
5. Airtight breather membrane
6. Ensure gap between wall plate and proprietary eaves vent is completely filled with insulation having a min. R-value across the insulation thickness of 1.2 m<sup>2</sup>k/W
7. 47mm x 35mm slate/tiling battens on counter batten to provide unobstructed air passage over insulation
8. 50mm KORE thermal board over rafters
9. 150mm KORE Lock panels, between each rafter, keeping panels flush with the under side of the rafter and closely butted at the ends
10. 12.5mm plaster slab with vapour control layer below rafter
11. Airtight tape applied to wall ceiling junction
12. 100mm x 75mm wall plate on continuous mortar bed, wall plate to be secured down to wall by restraint straps nailed to wall. Strap at least 750mm long, 450mm of which should be over blockwork
13. Insulated cavity closer to manufacturers specifications and details
14. Autoclaved aerated concrete (AAC) block to be used to ensure thermal break is maintained. (maximum thermal conductivity of 0.20 W/mk). AAC block to be installed so to avoid any effect of moisture on thermal conductivity
15. 15mm internal sand cement render (internal includes airtight parge coat)
16. Wall ties to manufactures specifications and details
17. 150mm KORE Fill Bonded Bead insulation
18. Expanded galvanised steel reinforcing mesh

## U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Warmark EPS100 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Warmark EPS 100 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.22
125mm	50mm	0.19
150mm	50mm	0.17
175mm	50mm	0.16
200mm	50mm	0.14

# Typical Construction & U-Value Calculations

**U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Warmsark EPS100 Silver (0.031W/mK)**

KORE Lock EPS70 Silver	KORE Warmsark EPS 100 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.16
125mm	100mm	0.15
150mm	100mm	0.13
175mm	100mm	0.12
200mm	100mm	0.11

**U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Warmsark EPS100 White (0.036W/mK)**

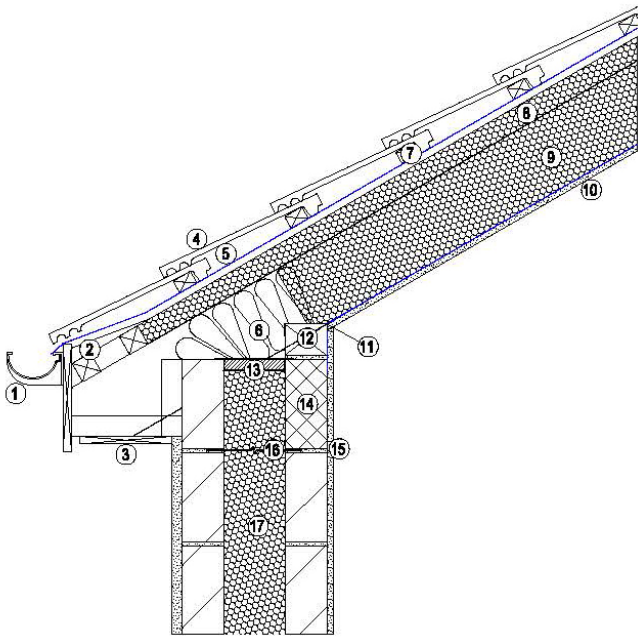
KORE Lock EPS70 White	KORE Warmsark EPS 100 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.25
125mm	50mm	0.22
150mm	50mm	0.20
175mm	50mm	0.18
200mm	50mm	0.16

**U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Warmsark EPS100 White (0.036W/mK)**

KORE Lock EPS70 White	KORE Warmsark EPS 100 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.19
125mm	100mm	0.17
150mm	100mm	0.15
175mm	100mm	0.14
200mm	100mm	0.13

# Typical Construction & U-Value Calculations

## Detail 2: Warm Pitched Roof - Insulation Between and Over Rafters (With Sarking Board)



1. Gutter
2. Tilting fillet/felt support to prevent ponding of felt at eaves level
3. Ventilated soffit
4. Tiled/slatted roof
5. Airtight breather membrane above 18mm sarking board
6. Ensure gap between wall plate and proprietary eaves vent is completely filled with insulation having a min R-value across the insulation thickness 1.25 m<sup>2</sup>k/W
7. 47mm x 35mm slate/tiling battens
8. 50mm KORE thermal board over rafters
9. 150mm KORE Lock panels, between each rafter, keeping panels flush with the under side of the rafter and closely butted at the ends
10. 12.5mm plaster slab with vapour control layer below rafter
11. Airtight tape applied to wall ceiling junction
12. 100mm x 75mm wall plate on continuous mortar bed, wall plate to be secured down to wall by restraint straps nailed to wall. Strap at least 750mm long, 450mm of which should be over blockwork
13. Insulated cavity closer to manufacturers specifications and details
14. Autoclaved aerated concrete (AAC) block to be used to ensure thermal break is maintained. (maximum thermal conductivity of 0.20W/mK). AAC block to be installed so to avoid any effect of moisture on thermal conductivity
15. 15mm internal sand cement render (internal include airtight parge coat)
16. Wall ties to manufacturers specifications and details
17. 150mm KORE Fill Bonded Bead insulation

### U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Warmark EPS100 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Warmark EPS 100 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.22
125mm	50mm	0.19
150mm	50mm	0.17
175mm	50mm	0.15
200mm	50mm	0.14

# Typical Construction & U-Value Calculations

**U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Warmsark EPS100 Silver (0.031W/mK)**

KORE Lock EPS70 Silver	KORE Warmsark EPS 100 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.16
125mm	100mm	0.14
150mm	100mm	0.13
175mm	100mm	0.12
200mm	100mm	0.11

**U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Warmsark EPS100 White (0.036W/mK)**

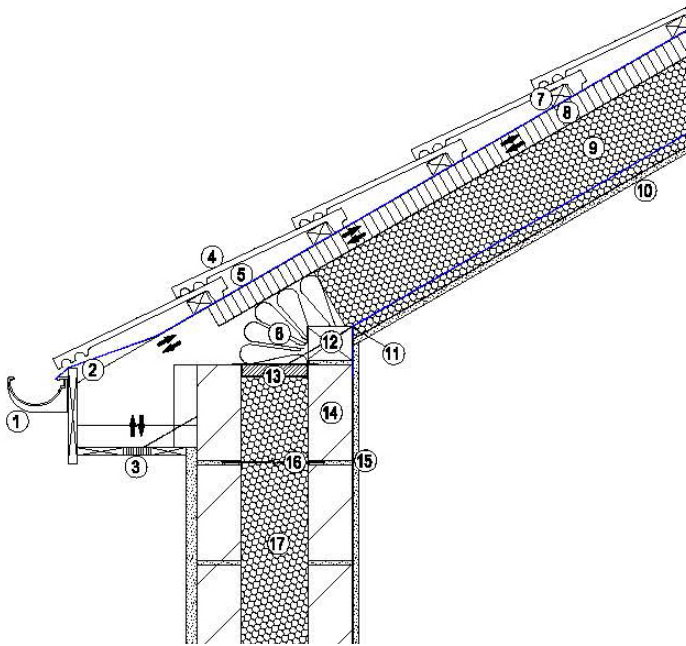
KORE Lock EPS70 White	KORE Warmsark EPS 100 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.25
125mm	50mm	0.22
150mm	50mm	0.19
175mm	50mm	0.17
200mm	50mm	0.16

**U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Warmsark EPS100 White (0.036W/mK)**

KORE Lock EPS70 White	KORE Warmsark EPS 100 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.18
125mm	100mm	0.17
150mm	100mm	0.15
175mm	100mm	0.14
200mm	100mm	0.13

# Typical Construction & U-Value Calculations

## Detail 3: Cold Pitched Roof - Insulation Between and Under Rafters (No Sarking Board)



1. Gutter
2. Tilting fillet/felt support to prevent ponding of felt at eaves level
3. Ventilated soffit
4. Tiled/slatted roof
5. Airtight breather membrane
6. Ensure gap between wall plate and proprietary eaves vent is completely filled with insulation having a min R-value across the insulation thickness of 1.2 m<sup>2</sup>K/W
7. 47mm x 35mm slate/tiling battens
8. Eaves ventilator to provide 25mm (min) unobstructed air passage over insulation
9. 150mm KORE Lock panels, between each rafter, keeping panels flush with the underside of the rafter and closely butted at the ends
10. KORE Linear dry lining panel with vapour control layer behind
11. Airtight tape applied to wall ceiling joint
12. 100mm x 75mm wall plate on continuous mortar bed, wall plate to be secured down to wall by restraint straps nailed to wall. Strap at least 750mm long, 450mm of which should be over blockwork
13. Insulated cavity closer to manufacturers specifications and details
14. Autoclaved aerated concrete (AAC) block to be used to ensure thermal break is maintained. (maximum thermal conductivity of 0.20 W/mK). AAC block to be installed so to avoid any effect of moisture on thermal conductivity
15. 15mm internal sand cement render (internal includes airtight parge coat)
16. Wall ties to manufacturers specifications and details
17. 150mm KORE Fill Bonded Bead Insulation

## U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.21
125mm	50mm	0.19
150mm	50mm	0.17
175mm	50mm	0.15
200mm	50mm	0.14



# Typical Construction & U-Value Calculations

U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.16
125mm	100mm	0.15
150mm	100mm	0.13
175mm	100mm	0.12
200mm	100mm	0.11

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

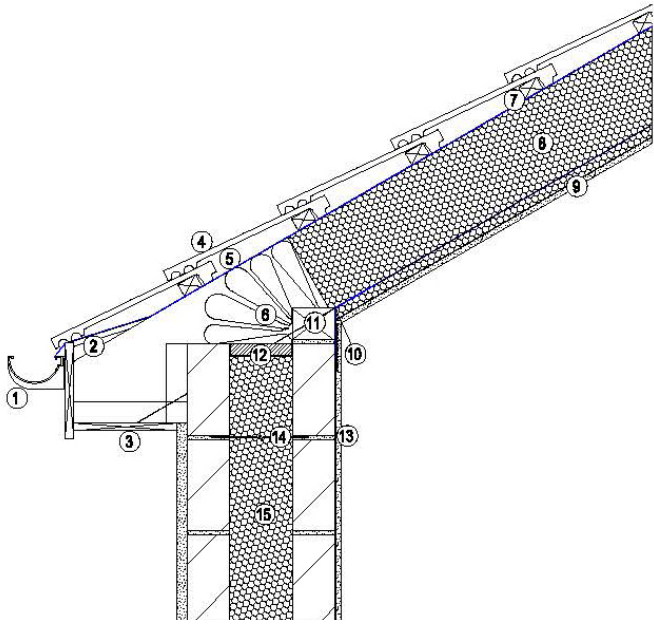
KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.25
125mm	50mm	0.22
150mm	50mm	0.20
175mm	50mm	0.18
200mm	50mm	0.16

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.19
125mm	100mm	0.17
150mm	100mm	0.16
175mm	100mm	0.14
200mm	100mm	0.13

# Typical Construction & U-Value Calculations

## Detail 4: Cold Pitched Roof - Insulation Between and Under Rafters - Unventilated (No Sarking Board)



1. Gutter
2. Tilting fillet/felt support to prevent ponding of felt at eaves level
3. Soffit
4. Tiled/slatted roof
5. Breather membrane
6. Ensure gap between wall plate and proprietary eaves vent is completely filled with insulation having a min. R-value across the insulation thickness of 1.2 m<sup>2</sup>K/W
7. 47mm x 35mm slate/tiling battens
8. 200mm KORE Lock variable width panels, between each rafter, keeping panels flush with the upper side of the rafter and closely butted at the ends
9. KORE Linear dry lining panel with vapour control layer behind
10. Airtight tape applied to wall ceiling junction
11. 100mm x75mm wall plate on continuous mortar bed, wall plate to be secured down to wall by restraint straps nailed to wall. Strap at least 750mm long, 450mm of which should be over blockwork
12. Insulated cavity closer to manufacturers specifications and details
13. 15mm internal sand cement render (internal includes airtight parge coat)
14. Wall ties to manufacturers specifications and details
15. 150mm KORE Fill Bonded Bead insulation

## U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.21
125mm	50mm	0.19
150mm	50mm	0.17
175mm	50mm	0.15
200mm	50mm	0.14

# Typical Construction & U-Value Calculations

U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.16
125mm	100mm	0.15
150mm	100mm	0.13
175mm	100mm	0.12
200mm	100mm	0.11

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

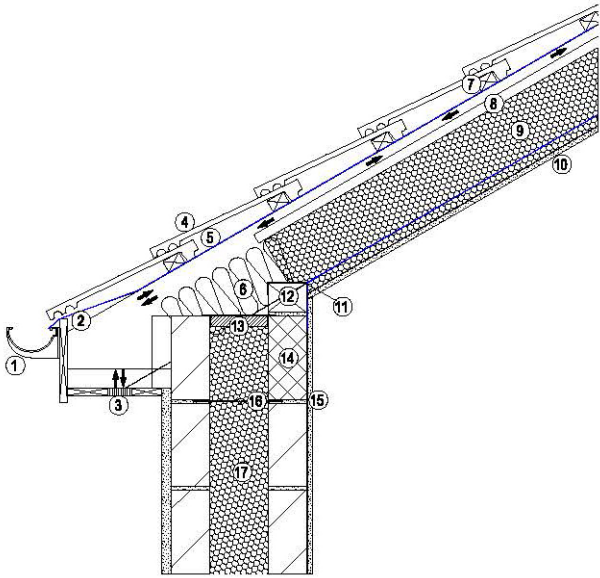
KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.25
125mm	50mm	0.22
150mm	50mm	0.20
175mm	50mm	0.18
200mm	50mm	0.16

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.19
125mm	100mm	0.17
150mm	100mm	0.16
175mm	100mm	0.14
200mm	100mm	0.13

# Typical Construction & U-Value Calculations

## Detail 5: Cold Pitched Roof - Insulation Between (Partial Fill) and Under Rafters - Ventilated (No Sarking Board)



1. Gutter
2. Tilting fillet/felt support to prevent ponding of felt at eaves level
3. Soffit
4. Tiled/slatted roof
5. Airtight breather membrane
6. Ensure gap between wall plate and proprietary eaves vent is completely filled with insulation have a min. R-value across the insulation thickness of 1.2 m<sup>2</sup>K/W
7. 47mm x 35mm slate/tiling battens
8. 25mm timber batten fixed to rafter to allow ventilation above
9. 150mm KORE Lock panels, between each rafter, keeping panels flush with the underside of the rafter and tightly butted at the ends
10. KORE Linear dry lining panel with vapour control layer behind
11. Airtight tape applied to wall ceiling junction
12. 100mm x 75mm wall plate on continuous mortar bed, wall plate to be secured down to wall by restraint straps nailed to wall. Strap at least 750mm long, 450mm of which should be over blockwork
13. Insulated cavity closer to manufacturers specifications and details
14. Autoclaved aerated concrete (AAC) block to be used to ensure thermal break is maintained. (maximum thermal conductivity of 0.20 W/mK. AAC block to be installed so to avoid any effect of moisture on thermal conductivity
15. 15mm internal sand cement render (internal includes airtight parge coat)
16. Wall ties to manufacturers specifications and details
17. 150mm KORE Fill Bonded Bead insulation

## U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.21
125mm	50mm	0.19
150mm	50mm	0.17
175mm	50mm	0.15
200mm	50mm	0.14

# Typical Construction & U-Value Calculations

U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.16
125mm	100mm	0.15
150mm	100mm	0.13
175mm	100mm	0.12
200mm	100mm	0.11

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

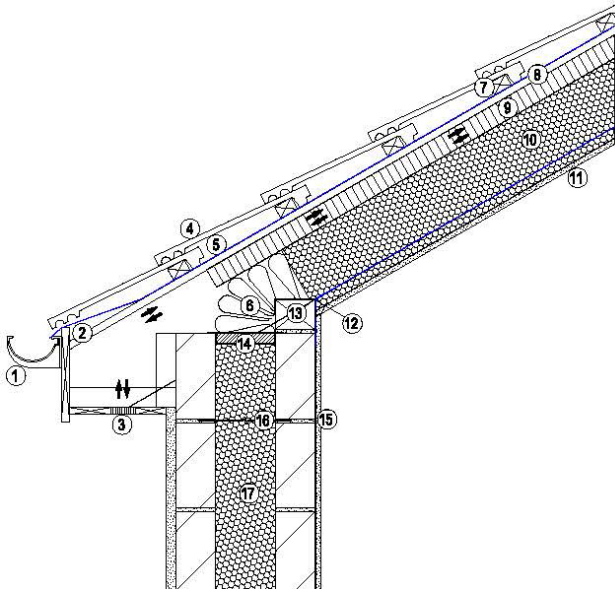
KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.25
125mm	50mm	0.22
150mm	50mm	0.20
175mm	50mm	0.18
200mm	50mm	0.16

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.19
125mm	100mm	0.17
150mm	100mm	0.16
175mm	100mm	0.14
200mm	100mm	0.13

# Typical Construction & U-Value Calculations

## Detail 6: Cold Pitched Roof - Insulation Between and Under Rafters (With Sarking Board)



1. Gutter
2. Tilting fillet/felt support to prevent ponding of felt at eaves level
3. Soffit
4. Tiled/slatted roof
5. Airtight breather membrane
6. Ensure gap between wall plate and proprietary eaves vent is completely filled with insulation having a min. R-value across the insulation thickness of 1.2 m<sup>2</sup>K/W
7. 47mm x 35mm slate/tiling battens
8. 25mm timber batten fixed to rafter to allow ventilation above
9. 150mm KORE Lock panels, between each rafter, keeping panels flush with the underside of the rafter and tightly butted at the ends
10. KORE Linear dry lining panel with vapour control layer behind
11. Airtight tape applied to wall ceiling junction
12. 100mm x 75mm wall plate on continuous mortar bed, wall plate to be secured down to wall by restraint straps nailed to wall. Strap at least 750mm long, 450mm of which should be over blockwork
13. Insulated cavity closer to manufacturers specifications and details
14. Autoclaved aerated concrete (AAC) block to be used to ensure thermal break is maintained. (maximum thermal conductivity of 0.20W/mK). AAC block to be installed so to avoid any effect of moisture on thermal conductivity
15. 15mm internal sand cement render (internal includes airtight parge coat)
16. Wall ties to manufacturers specifications and details
17. 150mm KORE Fill Bonded Bead insulation

## U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.21
125mm	50mm	0.19
150mm	50mm	0.17
175mm	50mm	0.15
200mm	50mm	0.14

# Typical Construction & U-Value Calculations

U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.16
125mm	100mm	0.15
150mm	100mm	0.13
175mm	100mm	0.12
200mm	100mm	0.11

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

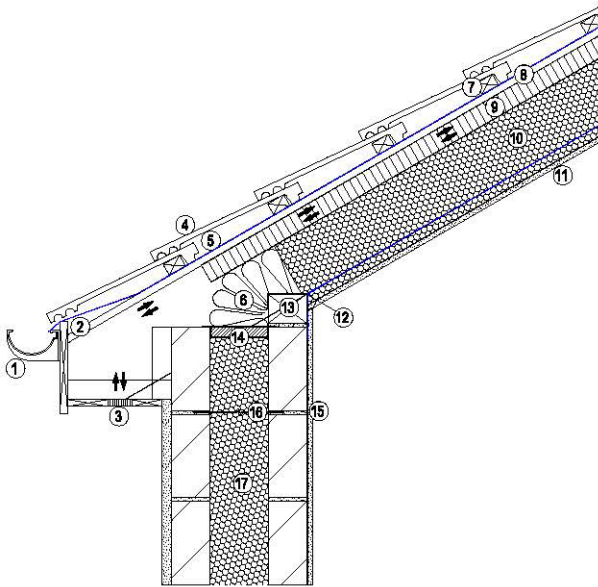
KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.25
125mm	50mm	0.22
150mm	50mm	0.20
175mm	50mm	0.18
200mm	50mm	0.16

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.19
125mm	100mm	0.17
150mm	100mm	0.16
175mm	100mm	0.14
200mm	100mm	0.13

# Typical Construction & U-Value Calculations

## Detail 7: Cold Pitched Roof - Insulation Between Rafters and Under Rafters (With Sarking Board)



1. Gutter
2. Tilting fillet/felt support to prevent ponding of felt at eaves level
3. Ventilated soffit
4. Tiled/slatted roof
5. Airtight breather membrane
6. Ensure gap between wall plate and proprietary eaves vent is completely filled with insulation having a min. R-value across the insulation thickness of 1.2 m<sup>2</sup>K/W
7. 47mm x 35mm slate/tiling battens
8. 18mm sarking board above rafters
9. Eaves ventilator to provide 25mm (min) unobstructed air passage over insulation
10. 150mm KORE Lock panels, between each rafter, keeping panels flush with the underside of the rafter and tightly butted at the ends
11. KORE Linear dry lining panel with vapour control layer behind
12. Airtight tape applied to wall ceiling junction
13. 100mm x 75mm wall plate on continuous mortar bed, wall plate to be secured down to wall by restraint straps nailed to wall. Strap at least 750mm long, 450mm of which should be over blockwork
14. Insulated cavity closer to manufacturers specifications and details
15. 15mm internal sand cement render (internal includes airtight parge coat)
16. Wall ties to manufacturers specifications and details
17. 150mm KORE Fill Bonded Bead Insulation

## U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.21
125mm	50mm	0.19
150mm	50mm	0.17
175mm	50mm	0.15
200mm	50mm	0.14



# Typical Construction & U-Value Calculations

U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.16
125mm	100mm	0.15
150mm	100mm	0.13
175mm	100mm	0.12
200mm	100mm	0.11

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

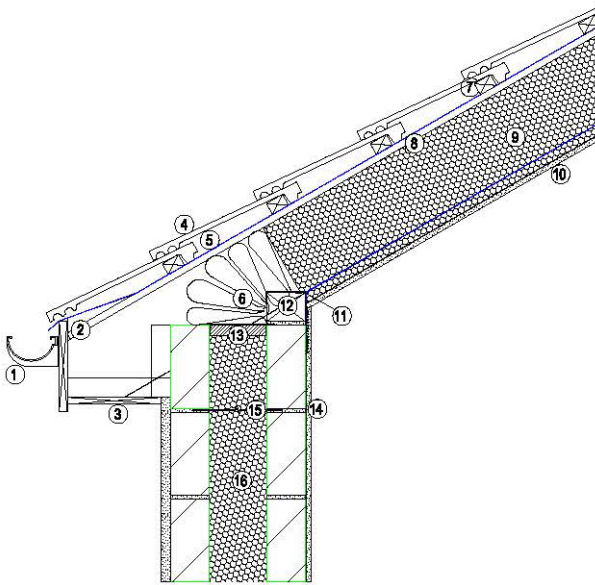
KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.25
125mm	50mm	0.22
150mm	50mm	0.20
175mm	50mm	0.18
200mm	50mm	0.16

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.19
125mm	100mm	0.17
150mm	100mm	0.16
175mm	100mm	0.14
200mm	100mm	0.13

# Typical Construction & U-Value Calculations

## Detail 8: Cold Pitched Roof - Insulation Between and Under Rafters - Unventilated (With Sarking Board)



1. Gutter
2. Tilting fillet/felt support to prevent ponding of felt at eaves level
3. Ventilated soffit
4. Tiled/slatted roof
5. Airtight breather membrane
6. Ensure a gap between wall plate and proprietary eaves vent is completely filled with insulation having a min. R-value across the insulation thickness of 1.2 m<sup>2</sup>K/W
7. 47mm x 35mm slate/tiling battens
8. 18mm sarking board
9. 150mm KORE Lock panels, between each rafter, keeping panels flush with the underside of the rafter and tightly butted at the ends
10. KORE Linear dry lining panel with vapour control layer behind
11. Airtight tape applied to wall ceiling junction
12. 100mm 75mm wall plate on continuous mortar bed, wall plate to be secured down to wall by restraint straps nailed to wall. Strap at least 750mm long, 450mm of which should be over blockwork
13. Insulated cavity closer to manufacturers specifications and details
14. 15mm internal sand cement render (internal includes airtight parge coat)
15. Wall ties to manufacturers specifications and details
16. 150mm KORE Fill Bonded Bead Insulation

## U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.21
125mm	50mm	0.19
150mm	50mm	0.17
175mm	50mm	0.15
200mm	50mm	0.14

# Typical Construction & U-Value Calculations

U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.16
125mm	100mm	0.15
150mm	100mm	0.13
175mm	100mm	0.12
200mm	100mm	0.11

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

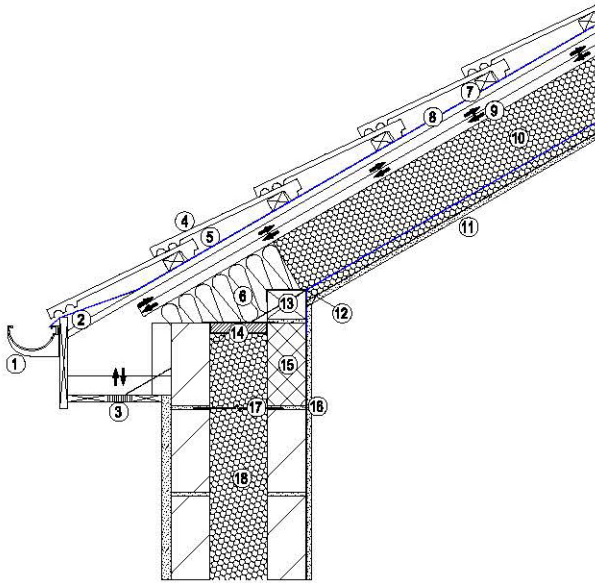
KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.25
125mm	50mm	0.22
150mm	50mm	0.20
175mm	50mm	0.18
200mm	50mm	0.16

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.19
125mm	100mm	0.17
150mm	100mm	0.16
175mm	100mm	0.14
200mm	100mm	0.13

# Typical Construction & U-Value Calculations

## Detail 9: Cold Pitched Roof - Insulation Between (Partial Fill) and Under Rafters - Ventilated (With Sarking Board)



1. Gutter
2. Tilting fillet/felt support to prevent ponding of felt at eaves level
3. Soffit
4. Tiled/slatted roof
5. Airtight breather membrane
6. Ensure gap between wall plate and proprietary eaves vent is completely filled with insulation having a min. R-value across the insulation thickness of 1.2 m<sup>2</sup>K/W
7. 47mm x 35mm slate/tiling battens
8. 18mm sarking board above rafters
9. 25mm timber battens fixed to rafter to allow ventilation above
10. 150mm KORE Lock panels, between each rafter, keeping panels flush with the underside of the rafter and closely butted at the ends
11. KORE Linear dry lining panel with vapour control layer behind
12. Airtight tape applied to wall ceiling junction
13. 100mm x 75mm wall plate on continuous mortar bed, wall plate to be secured down to wall by restraint straps nailed to wall. Strap at least 750mm long, 450mm of which should be over blockwork
14. Insulated cavity closer to manufacturers specifications and details
15. Autoclaved aerated concrete (AAC) block to be used to ensure thermal break is maintained (maximum thermal conductivity of 0.20 W/mK), AAC block to be installed so to avoid any effect of moisture on thermal conductivity
16. 15mm internal sand cement render (internal includes airtight parge coat)
17. Wall ties to manufacturers specifications and details
18. 150mm KORE Fill Bonded Bead Insulation

## U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.21
125mm	50mm	0.18
150mm	50mm	0.17
175mm	50mm	0.15
200mm	50mm	0.14

# Typical Construction & U-Value Calculations

U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK)

KORE Lock EPS70 Silver	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.16
125mm	100mm	0.14
150mm	100mm	0.13
175mm	100mm	0.12
200mm	100mm	0.11

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

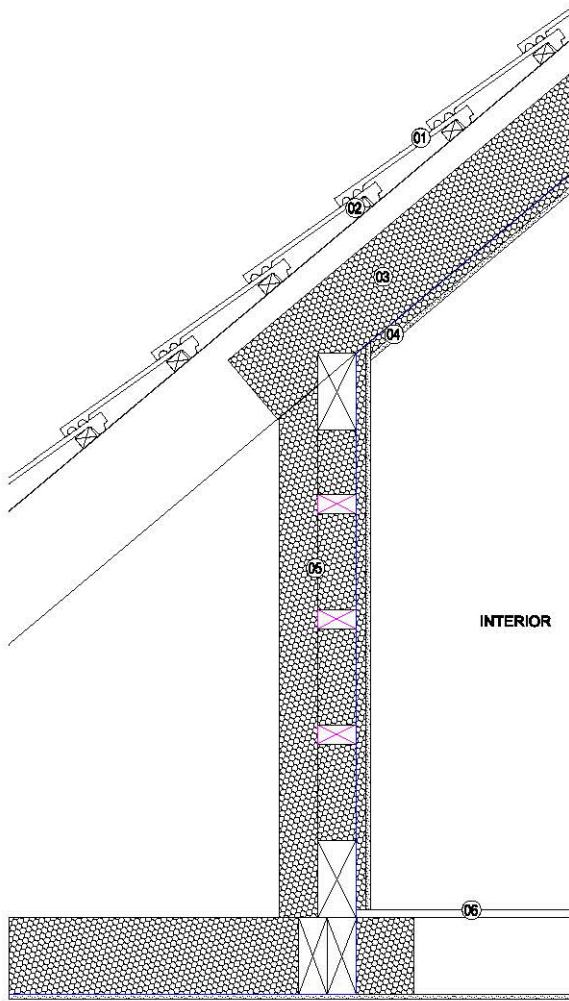
KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	50mm	0.24
125mm	50mm	0.21
150mm	50mm	0.19
175mm	50mm	0.17
200mm	50mm	0.16

U-Value Calculations: KORE Lock EPS70 White (0.037W/mK) & KORE Thermal Board EPS70 White (0.037W/mK)

KORE Lock EPS70 White	KORE Thermal Board EPS70 White (mm)	U-Value (W/m <sup>2</sup> K)
100mm	100mm	0.18
125mm	100mm	0.16
150mm	100mm	0.15
175mm	100mm	0.14
200mm	100mm	0.13

# Typical Construction & U-Value Calculations

## Detail 10: Dwarf Wall Detail



1. Tiled/slatted roof
2. 47mm x 35mm slate/tiling battens
3. 200mm KORE Lock variable width panels, between each rafter, keeping panels flush with the upper side of the rafter and tightly butted at the ends
4. KORE Linear dry lining panel with vapour control layer behind
5. 100mm KORE Lock panels in dwarf wall, tightly butted at the ends with second layer of KORE Lock panels fixed to back
6. Timber flooring

## U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK) - Ventilated Attic

KORE Lock EPS70 Silver Between Studs (mm)	KORE Lock EPS70 Silver Back Studs (mm)	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	40mm	50mm	0.19
100mm	50mm	50mm	0.18
100mm	60mm	50mm	0.17
100mm	70mm	50mm	0.16
100mm	80mm	50mm	0.16
100mm	90mm	50mm	0.15
100mm	100mm	50mm	0.14

# Typical Construction & U-Value Calculations

## U-Value Calculations: KORE Lock EPS70 Silver (0.031W/mK) & KORE Thermal Board EPS70 Silver (0.031W/mK) - Unventilated Attic

KORE Lock EPS70 Silver Between Studs (mm)	KORE Lock EPS70 Silver Back Studs (mm)	KORE Thermal Board EPS70 Silver (mm)	U-Value (W/m <sup>2</sup> K)
100mm	40mm	50mm	0.19
100mm	50mm	50mm	0.18
100mm	60mm	50mm	0.17
100mm	70mm	50mm	0.16
100mm	80mm	50mm	0.15
100mm	90mm	50mm	0.15
100mm	100mm	50mm	0.14

### Thermal Bridging

TGD Part L of the Irish Building Regulations states that care must be taken to ensure the continuity of insulation and to limit local thermal bridging and that any thermal bridge should not pose a risk of surface or interstitial condensation. KORE have undertaken a thermal bridging analysis of KORE Lock Insulation at this typical junction. Please contact our team today to request a copy of these results.

To minimise cold bridging at pitched roofs continuity of insulation between the wall and the attic junction is critical.

## Specification Guidelines

### Building Standards

KORE Lock Insulation can satisfy the requirements of the Irish Building Regulations as outlined in:

- Part L - Conservation of Fuel and Energy - Dwellings (2011)
- Part L - Conservation of Fuel and Energy - Buildings other than Dwellings (2008)

### Environmental

Expanded Polystyrene is BRE Green Guide A+ Rated.

### Design Standards

The following standards should be consulted regarding the construction of insulation at rafter level:

- BS 5250:2002 Code of practice for control of condensation in buildings

- BRE GBG37 Insulating roofs at rafter level: sarking insulation
- BS 9250:2007 Code of practice for design of the airtightness of ceilings in pitched roofs
- BRE BR262 Thermal insulation: avoiding risks 2nd edition
- IS ICP 2:2002 Code of practice for slating and tiling

For retrofit installations consult:

- NSAI S.R. 54:2014 Code of practice for the energy efficient retrofit of dwellings

### Ventilation Construction

With rafter insulation applications the designer will either choose a ventilated or an unventilated construction type. Unventilated design options are only suitable in retrofit situations where the structure is being re-roofed, as this level of retrofit will allow for a breathable sarking membrane to be installed. The majority of retrofit situations will not be

# Specification Guidelines

suitable for unventilated design.

The position of the insulation will determine the make up of the roof structure. In warm unventilated pitched roofs the insulation is placed between the rafters and over the rafters. This approach is favourable where very high thermal performance is required as the depth of insulation will not impact on head heights internally. Warm pitched roofs do not require cross ventilation because the insulation placed over the rafters reduces the thermal bridging effect and the structure of the roof is maintained at an environment close to that of an internal occupied space and thus reducing the risk from condensation. Where the rafters are not fully filled with insulation a service cavity between the insulation and the plasterboard can be maintained.

In cold unventilated pitched roofs the insulation is placed between the rafters and under the rafter. As per building regulations, a 50mm ventilated air gap between the insulation and the sarking felt must be maintained in order to avoid condensation. In some instances breathable sarking membrane may allow the recommended air gap to be reduced. In these instances the recommendations of the sarking membrane manufacturer must be followed.

## Sarking Membranes

It is recommended that pitched roofs with slates or tiles should incorporate an underlay to direct any penetrating or condensed water to the roof drainage system. The underlay will reduce the potential for wind uplift of unsecured slate and tile and also prevent wind driven rain, air particles and snow from entering the roof space. The underlay can be either fully supported on the KORE Board (fitted in horizontal runs), the sarking board (fitted in horizontal runs) or draped over the counter battens (fitted in vertical runs). The joints of the underlay must be sealed in accordance with the manufacturer's instructions. Holes and tears in the underlay should be made good before applying the external roof covering.

## Vapour Control Layer

A vapour control layer directly behind the internal finish can reduce the transfer of moisture into the insulated roof structure. It is important to note that vapour control layers are not a substitute for ventilation. A vapour control layer with the KORE Lock system can be provided by a vapour check plasterboard or by the application of two coats of Gyproc Drywall Sealer. Alternatively, a layer of polythene sheeting will provide a vapour control layer. The requirement for a

vapour control layer should be assessed in accordance with BS 5250:2002 Code of practice for control of condensation in buildings.

## Fire Stops

Building regulations should be considered for the requirements and provision of fire stops.

## Wind Loading

Across Ireland and the United Kingdom a variety of wind-loading and uplift conditions are experienced. Calculations to determine the correct size batten and the pattern of nailing must be determined for the particular site in accordance with the relevant code of practice.

## Detailed Specification Guide

A full specification guide is available on [www.kore-system.com](http://www.kore-system.com)



## Installation Guidelines: Warm Pitched Roof - Insulation Between and Above the Rafters

- Before fitting the KORE Warmark sheet a preservative treated stop rail must be fitted to the rafters at the eaves.
- KORE Warmark sheets are fitted across the line of the rafters, with the tongue and groove tightly fitted together. All sheets joints running from the eaves to the ridge must occur over the rafters.
- Ensure that the insulation is continued at the ridge of the roof.
- The tongue and groove on the sheet ensures boards are tightly fitted and therefore taping the joists is not required.
- The KORE Lock sheet can be fitted from the outside (before the KORE Warmark board is fitted) or from the inside (after the KORE Warmark board is fitted).
- When fitting from the outside commence by fitting the KORE Lock sheets between the rafters. When in position the sheet will expand to fill the rafter space completely. The sheet will not require fittings to stay in place.
- The KORE Lock sheets must be flush with the outside of the rafter to ensure there is no air movement between the KORE Lock and the KORE Warmark sheet.
- Where KORE Lock sheets need to be cut to fit between the rafters, sarking clips should be used to secure the insulation in place. Sarking clips must be to the correct size to ensure the KORE Lock sheet is flush with the outside of the timbers.
- Sheets should be closely butted together. Where rafters are cut in such a design that it makes fitting a ridge insulation difficult, causing small gaps in the insulation, it is necessary to fill the space with a flexible insulating material.
- When fitting KORE Lock from the inside the same fitting instructions apply, except, if necessary, sheets are secured in place with timber stop battens.

## Installation Guidelines: Cold Pitched Roof - Insulation Between and Under the Rafters

- When fitting KORE Lock sheets it is important to ensure a 50mm air space is maintained between the insulation sheet and the roof finish. This gap can be reduced where a breathable membrane is installed. Please follow the instructions of the membrane manufacturer on the appropriate air space to leave.
- Commence by fitting the KORE Lock sheets between each rafter, following the completion of the roof cladding. The KORE Lock sheet will compress slightly to allow the sheet to be fitted between the rafters. When in position the sheet will expand to fill the rafter space

completely. The sheet will not require fittings to stay in place.

- Keep sheets flush with the underside face of the rafter and closely butt at ends. This is to ensure that the necessary clear air space between the insulation and the membrane/sarking felt is maintained.
- Fix the first row of KORE Lock sheets to roof line at junction with vertical stud walls, beginning with the first slot. Repeat the procedure until the entire area is insulated.
- Where rafter width vary and sheets need to be cut to fit, the sheets may need to be secured into position with timber stop battens.
- Continue installation of the KORE Lock panels to vertical studding and ceiling collars until completed.
- Sheets should be closely butted together. Where rafters are cut in such a design that it makes fitting a ridge insulation difficult, causing small gaps in the insulation, it is necessary to fill this space with a flexible insulating material.
- Apply KORE Thermal Board to the underside of the rafters with suitable fixings, ensuring all joints are tightly sealed. Face with minimum 500 gauge polyethylene vapour barrier.

## Installation Guidelines: Dwarf Wall

- KORE Lock sheets should be friction fitted between the timber studding flush with the inside surface of the studs. This will prevent the risk of air movement between the sheets and the thermal plasterboard.
- To achieve greater thermal performance KORE EPS sheets can be fitted to the back of the studs using suitable fixings. The EPS sheets should be fixed directly to the timber studs.
- Apply KORE Thermal Board to the inside surface of the studs with suitable fixings, ensuring all joints are tightly sealed. Face with minimum 500 gauge polyethylene vapour barrier.

## Cutting & Packaging

On-site trimming of boards where necessary to maintain continuity of insulation is easily executed using a fine tooth saw or builder's knife. Care must be taken to maintain the thickness, flatness and squareness of the board to achieve close butting of joints and continuity of insulation.

KORE Lock Insulation boards must be protected from prolonged exposure to sunlight, and should be stored under cover in its original wrapping, not in contact with ground moisture and raised above ground level. Care must be taken to avoid contact with solvents and with materials containing volatile organic components such as tar and newly treated timber.

# Product Technical Details

## Properties

### Type

KORE Lock Insulation is supplied as EPS70 and EPS100 as defined in IS EN 13163:2012. Other densities and grades are available on request. Reaction to Fire Class E, containing a flame retardant additive.

### Density

KORE Lock EPS70 Silver & White:	15kg/m <sup>3</sup>
KORE Warsark EPS100 Silver & White:	20kg/m <sup>3</sup>
KORE Thermal Board EPS70 Silver & White	15kg/m <sup>3</sup>

### Thermal Conductivity

The thermal conductivity of KORE Lock Insulation products are in accordance with IS EN 13163:2012 and EN 12667 Thermal Performance of building materials and products - determination of thermal resistance by means of guarded hot plate and heat flow meter method.

• KORE Lock EPS70 White	0.037W/mK
• KORE Lock EPS70 Silver	0.031W/mK
• KORE Warsark EPS 100 White	0.036W/mK
• KORE Warsark EPS100 Silver	0.031W/mK
• KORE Thermal Board EPS70 White	0.037W/mK
• KORE Thermal Board EPS100 White	0.031W/mK

### Thermal Resistance

Thermal resistance, known as the R-value, varies with the thickness of the insulation. To calculate the thermal resistance (m<sup>2</sup>.K/W) divide the thickness of the insulation by its thermal conductivity and round down the result to the nearest 0.05.

Thickness Insulation (mm)	KORE Lock EPS70 White	KORE Lock EPS70 Silver
	Thermal Resistance (m <sup>2</sup> .K/W)	
100mm	2.70	3.23
125mm	3.38	4.03
150mm	4.05	4.84
175mm	4.73	5.65
200mm	5.41	6.45
250mm	6.76	8.06
275mm	7.43	8.87
300mm	8.11	9.68

Thickness Insulation (mm)	KORE Warsark EPS100 White	KORE Warsark EPS100 Silver
	Thermal Resistance (m <sup>2</sup> .K/W)	
40mm	1.11	1.29
50mm	1.39	1.61
60mm	1.67	1.94
70mm	1.94	2.26
80mm	2.22	2.58
90mm	2.50	2.90
100mm	2.78	3.23

Thickness Insulation (mm)	KORE Thermal Board EPS70 White	KORE Thermal Board EPS70 Silver
	Thermal Resistance (m <sup>2</sup> .K/W)	
25mm	0.68	0.81
38mm	1.03	1.23
50mm	1.35	1.61
88mm	2.38	2.84

### Durability

The KORE Lock, KORE Warsark and KORE Thermal Board are rot-proof, water repellent and durable.

### Behaviour in Fire

The KORE Lock Systems (warm and cold roof application) will not affect the external fire rating of roofs on which it is incorporated. The internal plasterboard finish will achieve a class 0 performance classification.

### Dimensions

Standard Size

KORE Lock	1.200m x .377m (400mm centres)
KORE Warsark	1.200m x .450m (T&G)
KORE Thermal Board	2.438m x 1.195m 2.743m x 1.195m

Standard Thickness: KORE Lock (all grades): 100mm, 125mm, 150mm, 175mm, 200mm, 250mm, 275mm, 300mm

KORE Warsark (all grades): 40mm - 100mm increments of 10mm

KORE Thermal Board (overall): 38mm, 50mm, 62mm, 100mm

# Product Technical Details

Project specific dimensions can be accommodated.

## Tolerances

Characteristic	Level/Class/ Limit Value	Value (mm)	Standard
Thickness	T2	±2mm	EN823
Length	L3	±3mm	EN822
Width	W3	±3mm	EN822
Squareness	S5	±5mm	EN824
Flatness	P5 ≤0.72m <sup>2</sup> P15 >0.72m <sup>2</sup>	±15mm	EN825

## Dimensional Stability

KORE Lock EPS70: In accordance with IS EN 13163:2012 and EN1603, dimensional stability, DS(N)5, declared value ± 0.5%,

KORE Warsark EPS100: In accordance with IS EN 13163:2012 and EN1603, dimensional stability, DS(N)5, declared value ±0.5%.

## Compressive Strength

KORE Lock EPS70: In accordance with IS EN 13163:2012 and EN826, compressive strength at 10% deformation, CS(10)70, declared value 82kPa.

KORE Warsark EPS100: In accordance with IS EN 13163:2012 and EN826, compressive strength at 10% deformation, CS(10)100, declared value 108kPa.

## Bending Strength

KORE Lock EPS70: In accordance with IS EN 13163:2012 and EN12089, bending strength, BS115, declared value ≥115.

KORE Warsark EPS100: In accordance with IS EN 13163:2012 and EN12089, bending strength, BS150, declared value ≥150.

## Tensile Strength

KORE Lock EPS70: In accordance with IS EN 13163:2012 and EN1607, tensile strength perpendicular to the surface, TR150, declared value ≥150kPa.

KORE Warsark EPS100: In accordance with IS EN 13163:2012 and EN1607, tensile strength perpendicular to the surface, TR150, declared value ≥150kPa.

## Long Term Water Absorption by Partial Immersion

KORE Lock EPS70: In accordance with IS EN 13163:2012 and EN12087, long term water absorption by partial immersion, declared value WL(P)i 0.2kg/m<sup>2</sup>.

KORE Warsark EPS100: In accordance with IS EN 13163:2012 and EN12087, long term water absorption by partial immersion, declared value WL(P)i 0.2kg/m<sup>2</sup>.

## Long Term Water Absorption by Total Immersion

KORE Lock EPS70: In accordance with IS EN 13163:2012 and EN12087. long term water absorption by total immersion, declared value WL(T)i 5%.

KORE Warsark EPS100: In accordance with IS EN 13163:2012 and EN12087, long term water absorption by total immersion, declared value WL(T)i 4.5%.

## Certification

NSAI Irish Agreement Certificate Number 05/0235.

## Standards

KORE Lock Insulation is manufactured to BS EN 13163:2012 under Quality System approved to EN ISO 9001:2008 Quality Management.

# Technical Services

Contact our team today for:

- U-value calculations
- Condensation risk analysis
- Determination of exposure zone
- Accredited drawings and details
- Thermal bridging analysis results
- Temperature factor analysis

## Other Products

KORE Lock Roof Insulation can be installed in conjunction with a wide range of KORE products and services. When installing KORE Lock Insulation, consider the following products for a whole-home solution:

- KORE Passive Slab Insulated Foundation System
- KORE External Wall Insulation
- KORE Fill Bonded Bead Cavity Wall Insulation
- KORE's Range of Draught Proofing Solutions
- KORE Wall and Roof Ventilation
- KORE Hot and Cold Water Lagging and Jackets
- KORE's Pipe Insulation

## Contact Details

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**KORELOCK**



A Product of **AIRPACKS**

The Green, Kilnaleck, Co. Cavan, Ireland