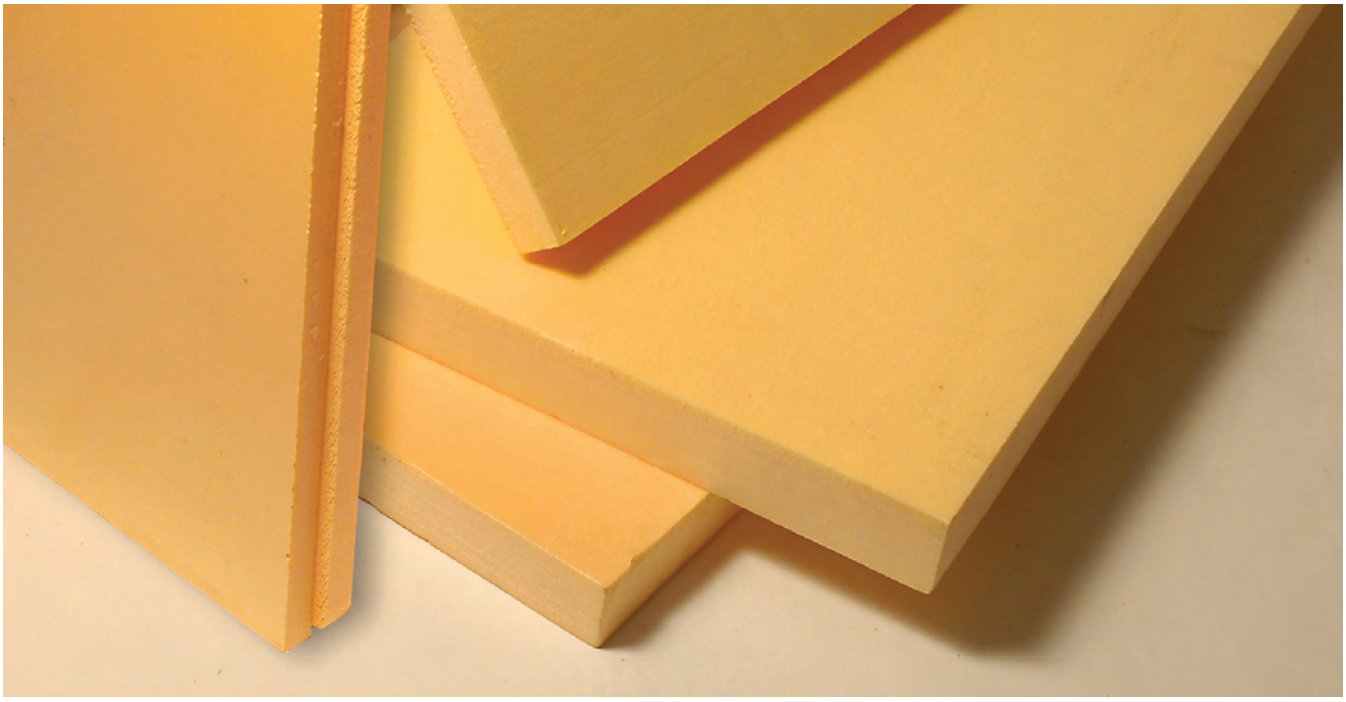
KNAUF INSULATION
it's time to save energy

October 2015

ClimaFoam®

ClimaFoam XPS Board
Concrete slab – insulation guide



Expertise in insulation

Knauf Insulation has over 30 years experience in insulation manufacture and as a producer of extruded polystyrenes (XPS) insulation, we are able to provide a high thermal solution for specialist applications.

ClimaFoam® XPS Board

Excellent energy efficiency and insulation performance

ClimaFoam XPS Board is an extruded polystyrene product. It has a compressive strength of 300 kPa and is one of the strongest and most reliable insulation products that is ideal for tough New Zealand climatic conditions. Able to resist wet conditions, high impact loads and extreme temperatures, ClimaFoam XPS Board provides high thermal insulation performance and can be used in areas where other types of insulation are not suitable. ClimaFoam XPS Board has a thermal conductivity rating of 0.027W/mK at 15°C, enabling a thinner layer of insulation in thickness constrained applications.

ClimaFoam XPS Board is supplied with a ship-lap join down the long sides of each sheet. This is to allow for easier installation and to minimise gaps.

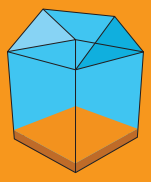
High compressive strength

ClimaFoam XPS Board delivers exceptional compressive strength for industrial and residential floors where a designer wants to keep the cold out but retain the strength in the concrete slab. For buildings such as warehouses and factories, which are being designed to withstand high loads from large vehicles or equipment, ClimaFoam XPS Board has proven long-term performance.

Moisture resistance

The moisture resistance of ClimaFoam XPS Board allows for it to be exposed to ground water, with negligible impact on thermal performance. ClimaFoam XPS Board is also ideal for perimeter slab insulation and under-slab insulation where water resistance is important.

This document has been produced as a guide for designers to achieve an increased thermal performance in concrete slab construction.



Concrete Floors

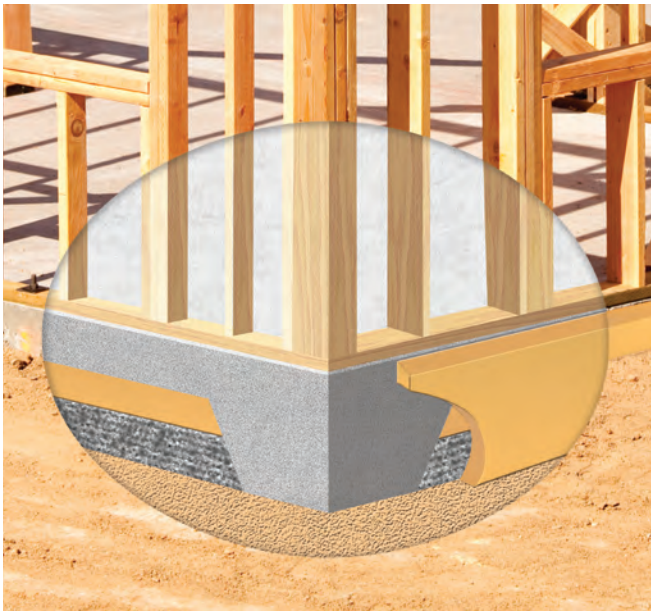
Floors can offer excellent thermal performance by incorporating high levels of insulation.

Slab and perimeter insulation

Concrete floors such as slab on ground can be designed to achieve excellent thermal performance. A well-insulated concrete slab will contribute to the building's thermal envelope, save energy and help to reduce energy costs.

Under slab insulation

ClimaFoam XPS Board has high compressive strength and moisture resistance, which makes it ideal for installation under the concrete slab to prevent thermal loss through the ground. ClimaFoam XPS Board is available in a range of thicknesses and can be multi-layered to achieve high thermal resistance.



Perimeter insulation

The addition of perimeter insulation will complete the thermal envelope and provide a simple and effective method of improving the performance of the concrete floor. ClimaFoam XPS Board can be retrofitted to existing properties or installed before or after the concrete is poured in new build applications.

ClimaFoam XPS Board should be installed as a continuous barrier around the slab edge and cover as much of the footing as possible. Earth can be backfilled directly against the insulation and the exposed surface should be protected with a plaster finish or a suitable sheet material.

Under floor heating

Under floor heating is a popular build consideration when using a concrete slab. Installing ClimaFoam XPS Board under the slab is ideal to ensure optimal performance of the heating and Building Code requirements are being met. This will also help to minimise heat loss and reduce energy costs.

Underfloor footings and thickenings

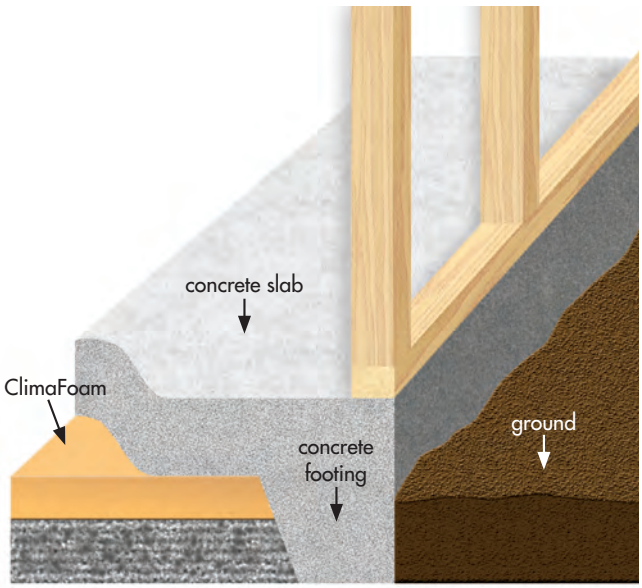
The high compressive strength of ClimaFoam XPS Board makes it suitable to be placed under footings and slab thickenings. For details, please consult the designer or the project engineer.

Under-slab insulation

• ClimaFoam® XPS Board provides excellent thermal performance for the insulation of concrete slabs. ClimaFoam XPS Board can be multi-layered to achieve extremely high thermal resistance.

• ClimaFoam XPS Board is typically installed between the damp proof course (DPC) and the concrete slab, but due to its high level of moisture resistance it can be installed under the DPC if required.

• The high compressive strength of ClimaFoam XPS Board makes it suitable to be placed under footings and slab thickenings. For details please consult the designer or the project engineer.



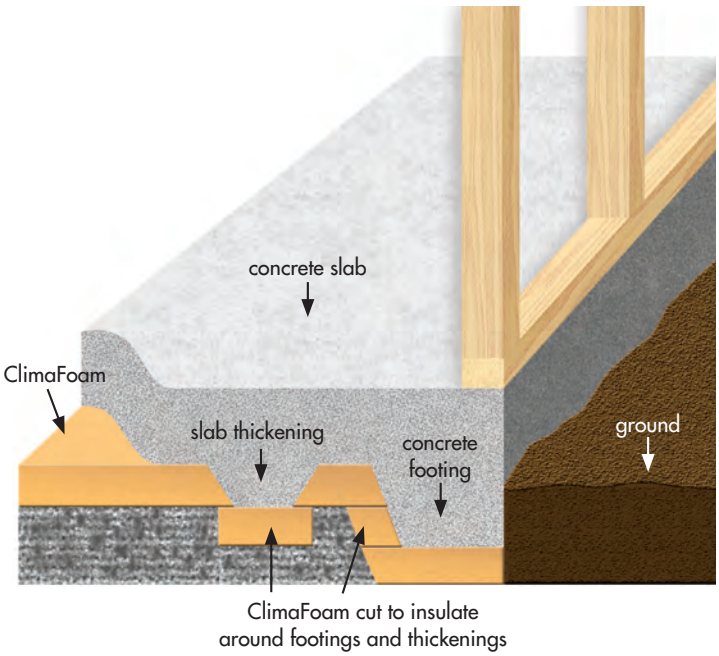


Table 1) ClimaFoam XPS Board under slab insulation

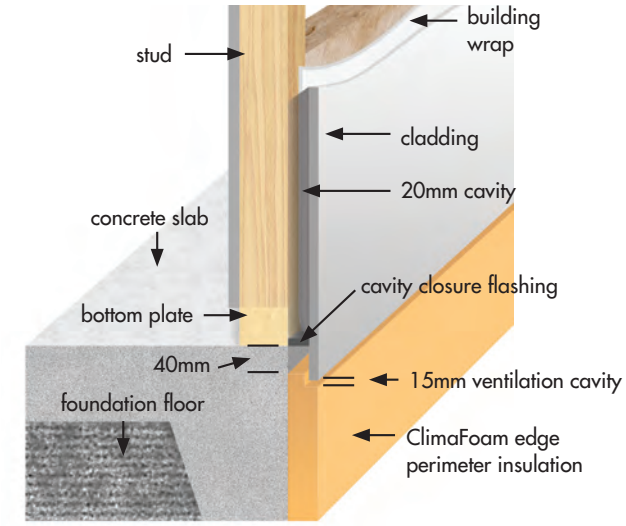
Wall stud depth (mm)	ClimaFoam thickness (mm)	Area/perimeter ratio (Total slab area ÷ the total length of the perimeter)						
		1.3	1.9	2.2	2.5	2.8	3.1	4
		Total construction R-Value (m^2K/W)						
90	30	2.03	2.30	2.43	2.56	2.68	2.81	3.16
	40	2.38	2.65	2.78	2.90	3.03	3.15	3.51
	50	2.72	2.99	3.12	3.25	3.37	3.50	3.85
	75	3.59	3.85	3.98	4.11	4.23	4.36	4.71
	100*	4.45	4.72	4.85	4.97	5.10	5.22	5.58
140	30	2.12	2.41	2.55	2.68	2.82	2.95	3.33
	40	2.46	2.75	2.89	3.03	3.16	3.29	3.67
	50	2.81	3.10	3.24	3.37	3.51	3.64	4.02
	75	3.67	3.96	4.10	4.23	4.37	4.50	4.88
	100*	4.53	4.82	4.96	5.10	5.23	5.36	5.74

* 2 layers of 50mm

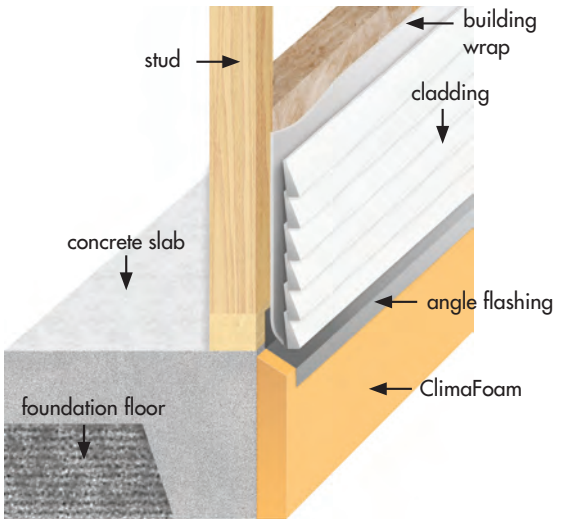
Perimeter insulation details

ClimaFoam® XPS Board is an ideal product to insulate the perimeter of concrete slabs. Earth can be backfilled directly against the insulation, but it is recommended that exposed insulation is protected with a plaster finish or a suitable sheet product. ClimaFoam XPS Board can be adhered to the slab using fixings prior to pouring the concrete, glue or mechanical fixings can also be used after the slab is formed.

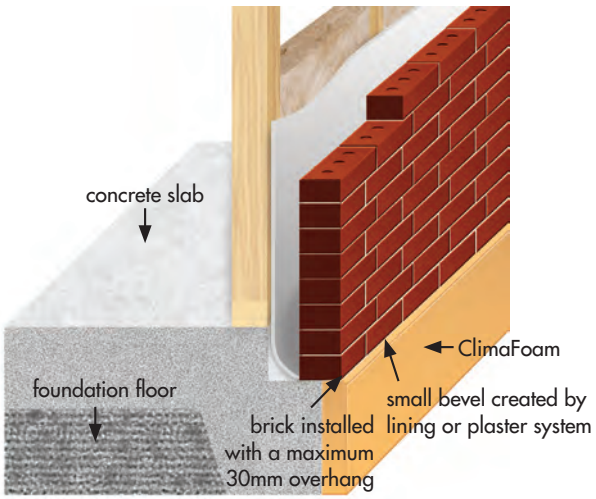
1. Cavity cladding



2. Direct-fix cladding



3. Brick veneer - with maximum 30mm overhang



4. Brick veneer - concrete block or solid construction

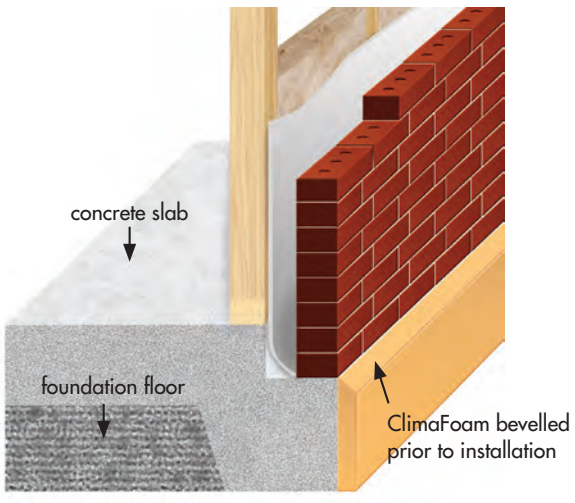


Table 2. Concrete slab on ground with perimeter insulation only

Wall stud depth (mm)	ClimaFoam thickness (mm)	Area/perimeter ratio (Total slab area ÷ the total length of the perimeter)						
		1.3	1.9	2.2	2.5	2.8	3.1	4
		Total construction R-Value (m^2K/W)						
90	30	1.10	1.40	1.51	1.64	1.78	1.91	2.30
	50	1.12	1.43	1.55	1.70	1.83	1.97	2.36
140	30	1.17	1.48	1.63	1.78	1.92	2.06	2.47
	50	1.19	1.51	1.67	1.84	1.98	2.12	2.53

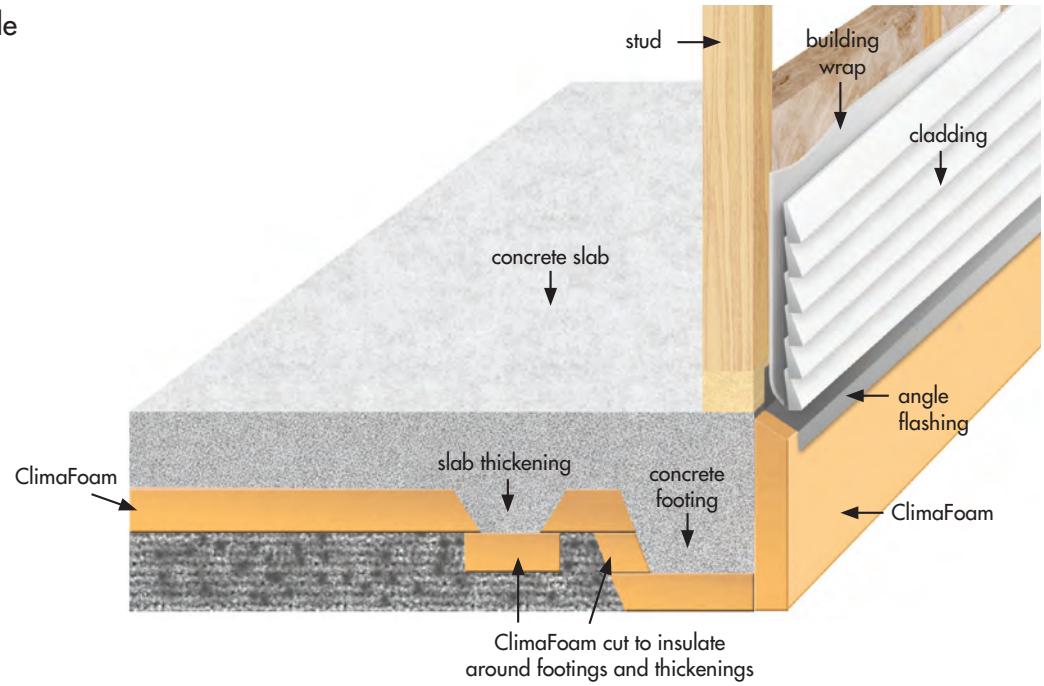
Combined perimeter and under-slab insulation values

Table 3. Concrete slab on ground with 30mm edge insulation and selected under slab insulation thickness

Wall stud depth (mm)	ClimaFoam® thickness (mm)	Area/perimeter ratio (Total slab area ÷ the total length of the perimeter)						
		1.3	1.9	2.2	2.5	2.8	3.1	4
		Total construction R-Value (m^2K/W)						
90	0	1.08	1.37	1.51	1.64	1.78	1.91	2.29
	30	2.09	2.38	2.52	2.66	2.79	2.93	3.31
	50	2.78	3.07	3.21	3.35	3.48	3.62	4.00
	100*	4.51	4.80	4.94	5.07	5.21	5.34	5.73
140	0	1.17	1.48	1.63	1.78	1.92	2.06	2.47
	30	2.19	2.50	2.65	2.79	2.94	3.08	3.49
	50	2.88	3.19	3.34	3.48	3.63	3.77	4.18
	100*	4.60	4.91	5.06	5.21	5.35	5.49	5.90

* 2 layers of 50mm

* Example



Notes

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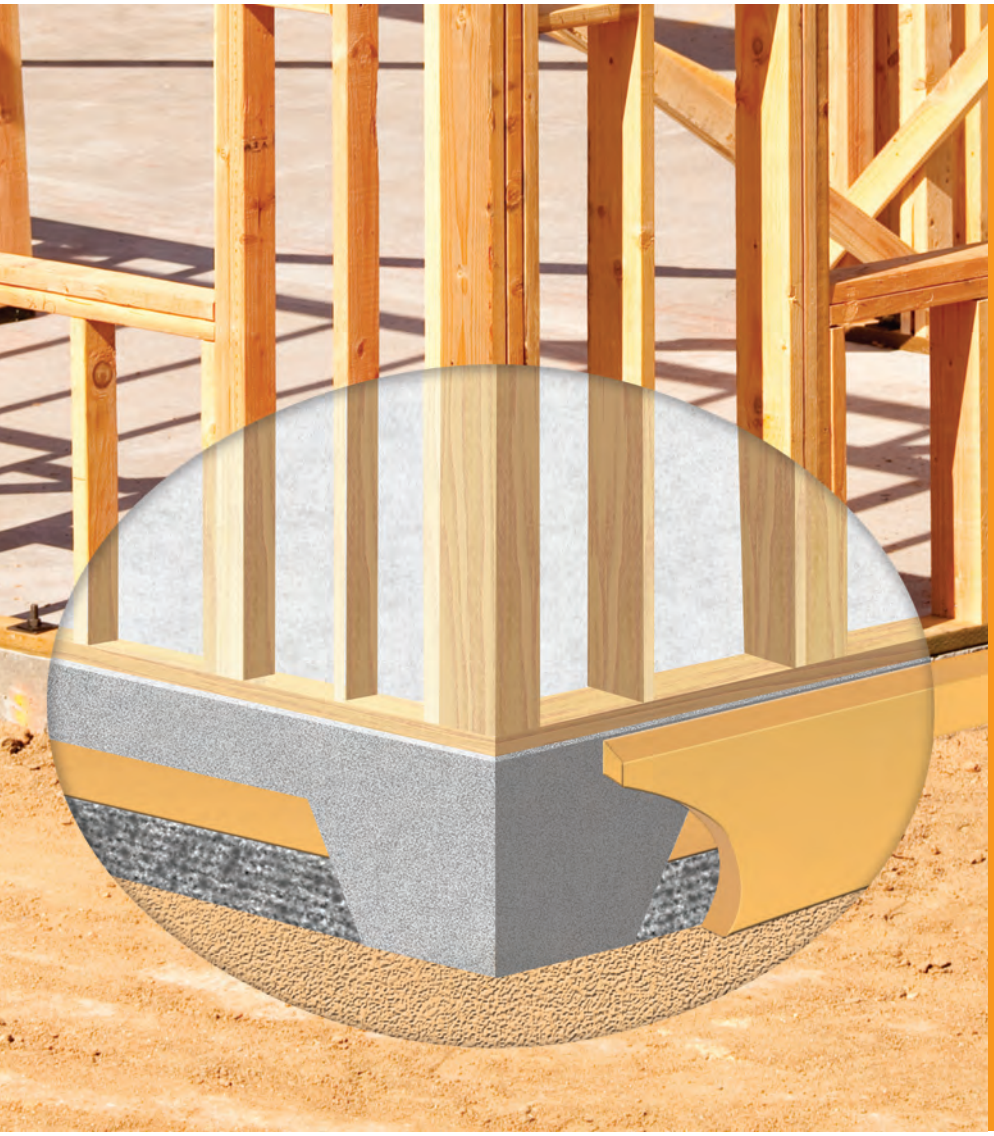

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