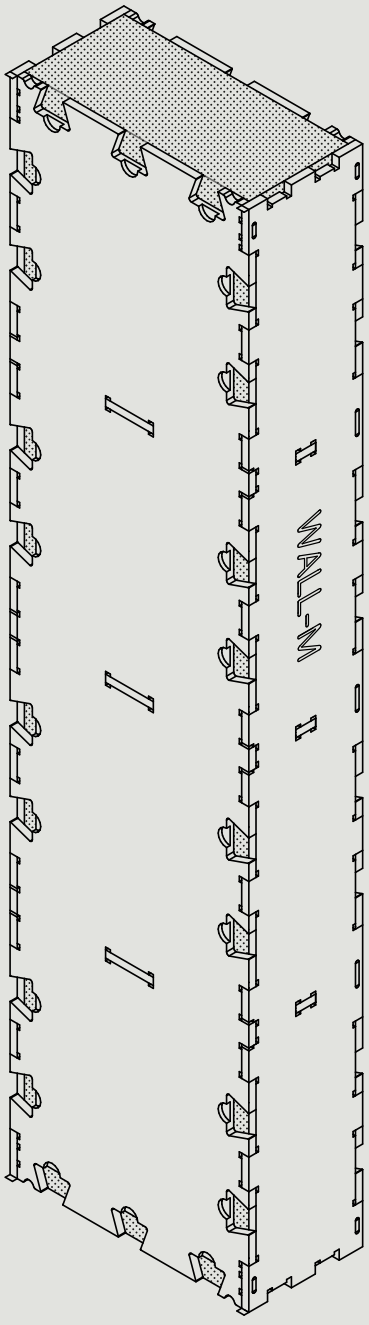
Technical specifications

Skylark version 1.0



Product description	WikiHouse Skylark is a system of modular building blocks comprising load-bearing floor, wall, and roof elements. WikiHouse blocks are made up of 18 mm thick timber panels, which are precision cut using a CNC machine and assembled off-site. The blocks are filled with insulation, and they can be rapidly assembled on-site to form an accurate structural chassis, even by small teams with no traditional construction skills.
Materials	WikiHouse blocks are manufactured from 18mm strucutural panels, usually either OSB3 or spruce plywood. Any insulation can be used, but we recommend blanket insulation that comes in rolls or semi-rigid batts, such as mineral wool, natural fibre insulation or other recycled materials.
Suitable uses	WikiHouse Skylark is suitable for detached buildings up to three storeys for residential, leisure or commercial uses. It can also be used for extensions, rooftop projects and indoor structures.
Foundations	WikiHouse Skylark can be used with any foundation type. Where possible we recommend the use of screw-pile foundations. The WikiHouse chassis sits onto timber ‘rails’ which must be level and accurate to +/- 10mm.
Cladding	The structure must be kept dry using a breathable external membrane. Any exterior rainscreen cladding can be used, fixed at any point. Always allow ventilation behind any cladding or roofing products used.
Internal finishing	The structure must be lined with an airtight vapour barrier membrane. It can then be lined with any suitable material, including using battens if appropriate to create voids for services. Typically plasterboard or equivalent is used to provide adequate fire protection.
Shipping & storage of blocks	Blocks should be kept dry and out of direct sunlight if possible prior to construction. Blocks are typically transported in a curtainside lorry. In some cases they can be offloaded by hand by a team of at least 4 people, or by use of a forklift (recommended).
Assembly	Foundations and groundworks should be completed before delivery. We can provide a chassis assembly manual but assembler is responsible for building in a safe way. Many blocks can be assembled by hand by a team of at least 4 people. Heavier blocks, and blocks that require lifting should be safely lifted using a genie lift, forklift or crane. In the event of rain before the structure is complete and wrapped the structure should be temporarily covered to prevent the timber blocks swelling before assembly is complete. Chassis must be dry before lining.

Performance

Precision

WikiHouse blocks are accurate to +/- 1mm. This means the building is exceptionally accurate to design dimensions, but over the entire length of a building the dimension can vary by up to 2mm x the number of blocks along a length. We recommend leaving tolerance within foundation rails where possible, and window details that allow for +/- 5mm for window openings. Double check dimensions on-site.

Embodied carbon

A typical 100m² WikiHouse chassis emits around 75kgCO_2e/m² in its production and delivery. Combined with other building elements (other than brick and conrete) total project emissions of 100kgCO_2e/m² are a reasonable goal.

The WikiHouse chassis also stores around -350kgCO_2e/m² of sequestered carbon. The initial project can therefore be considered net carbon negative. However it is essential that blocks are reused, or recycled responsibly at the end of their life.

Circularity

WikiHouse blocks are almost entirely composed of natural timber from sustainable sources. Wherever possible, dry processes should be used to allow disassembly and re-use of components at the end of the building life, with almost no waste.

Offcuts from manufacturing are recycled either as fuel or for other wood products.

Energy performance

WikiHouse Skylark is suitable for detached buildings up to three storeys for residential, leisure or commercial uses. It can also used for extensions and rooftop projects. Our team can advise further on suitability for specific projects and sites.

It is suitable for all climates, although extremely cold regions may require additional insulation, and hotter regions will require additional internal thermal mass.

Airtightness

The WikiHouse chassis must be lined on the inside with a vapour barrier to prevent condensation within the structure. As a result, very high levels of airtightness are achievable. Service penetrations must be sealed. We strongly recommend use of MVHR (Mechanical Ventilation with Heat Recovery) to ensure good ventilation and conserve energy.

Durability

The materials used to make WikiHouse blocks typically have a certified life of 60 years, but provided blocks are kept dry and protected, it should last much longer than this. Ensure protection from weather, condensation, rodents and insect attack.

Thermal comfort

A typical Skylark 250 wall block has a U-value of 0.15 W/m²K, so buildings are ultra-low energy by default. Additional insulation can also be added.

To avoid overheating in summer, adequate shading must be included in the design, along with cross-ventilation and roof vents where possible. We also recommend adding additional thermal mass into walls, floors and ceilings inside the building wherever possible.

Health

WikiHouse blocks are only made from materials with zero-added formaldehyde (class E1), so the only formaldehyde present is that which is naturally present within the timber. However, when creating airtight buildings it is essential to ensure good ventilation due to VOCs that may come from all internal elements, including furniture. We strongly recommend use of MVHR.

Fire resistance

WikiHouse walls with plasterboard build-up are certified for a fire resistance time of up to 90 minutes (REI 90) and WikiHouse floors / roofs up to 60 minutes (REI 60) making WikiHouse suitable for buildings up to three storeys in height.

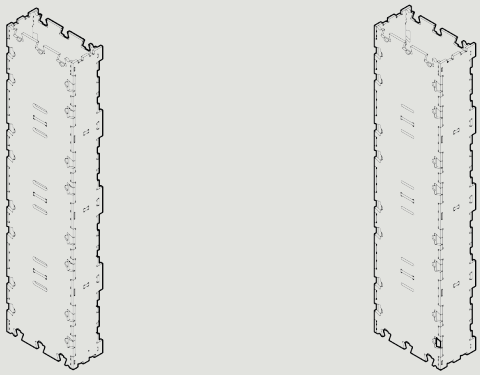
Seismic

WikiHouse Skylark has not yet been tested for earthquake resistance but it can still be used in seismic areas. Your structural engineer will probably have to conservatively assume nominal ductility.

Sizes

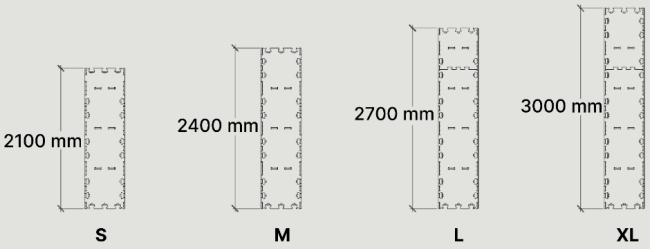
SERIES

WikiHouse Skylark blocks come in two distinct series: 200 and 250. Skylark 250 is the primary building system, while Skylark 200 is well suited to single storey buildings, or with lower thermal performance requirements.



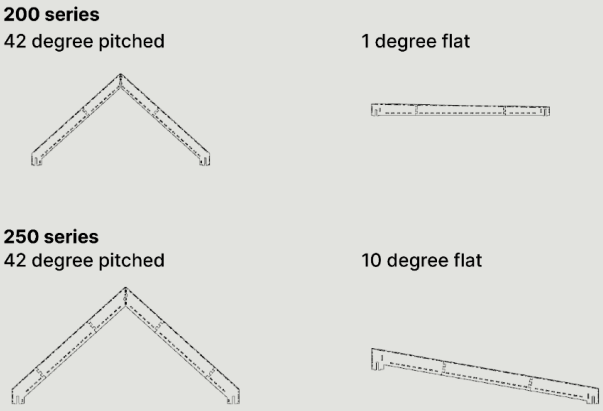
WALLS

Standard wall blocks come in 600mm widths and cover a range from 2.1 m to 3 m height. Higher hights are possible on custom blocks. There are also angled wall blocks for the gable ends on pitched roofs.



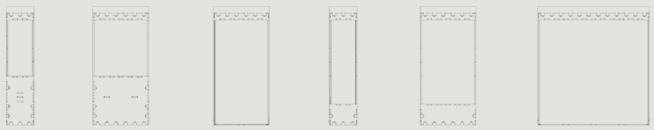
ROOFS

Roof blocks come with 3 pitch degrees: flat, 10 degrees and 42 degree. Different angles are possible on custom blocks.



WINDOWS & DOORS

Standard windows blocks cover a range from 528mm to 2328mm openings. Other opening sizes are possible on custom blocks.



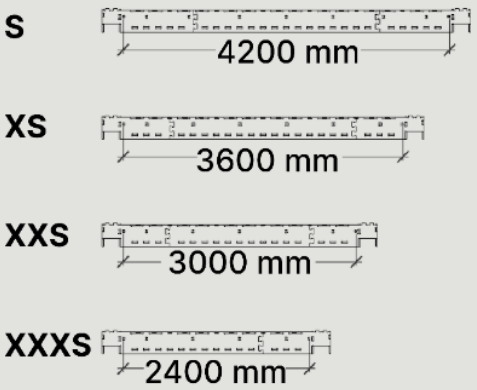
FLOOR SPANS

Standard FLOOR blocks covers a range of spans from 2.4 m (XXXS) to 5.4 m (L) assuming typical live loads (2 kN/m2). Longer spans are possible on custom blocks.

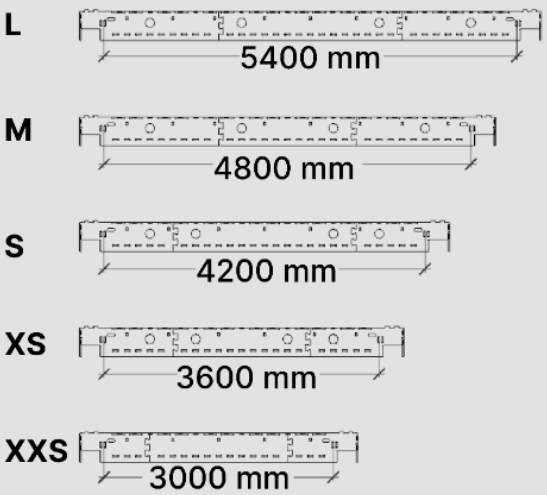
It is also possible to make thinner depth floors if supported from below.

	Block	Length (mm)	Internal span (mm)	Depth (mm)
Skylark 200	XXXS	2936	2400	282
	XXS	3536	3000	282
	XS	4136	3600	282
	S	4736	4200	282
Skylark 250	XXS	3636	3000	380
	XS	4236	3600	380
	S	4836	4200	380
	M	5436	4800	380
	L	6036	5400	380

Skylark 200



Skylark 250



Structural performance

Gravity loads

Beams

WikiHouse Skylark beams can support gravity loads. Bending moment and shear capacity* as shown here:

	Block	Length (m)	Mrd (kNm)	Vrd (kN)
Skylark 200	XXXS	2.9	3.69	69
	XXS	3.5	6.15	69
	XS	4.1	8.61	69
	S	4.7	8.61	69
Skylark 250	XXS	3.6	25.2	93
	XS	4.2	14.0	93
	S	4.8	19.6	93
	M	5.4	14.0	93
	L	6.0	19.6	93

Walls

The vertical axial capacity of WikiHouse wall blocks is as shown here:

	Block	Height (mm)	Nrd (kN)
Skylark 250	S	2.9	3.69
	M	3.5	6.15
	L	4.1	8.61
	XL	4.7	8.61

Lintels

WikiHouse Skylark windows and door blocks come with an integrated lintel. This is realized with 1, 2 or 3 18mm boards to accommodate different gravity loads:

Number of boards	Mrd (kNm)	Vrd (kN)	Mrd (kNm)	Vrd (kN)
1	3.3	4.0	4.6	4.0
2	6.6	8.0	9.2	8.0
3	9.9	12.0	13.8	12.0

Lateral loads

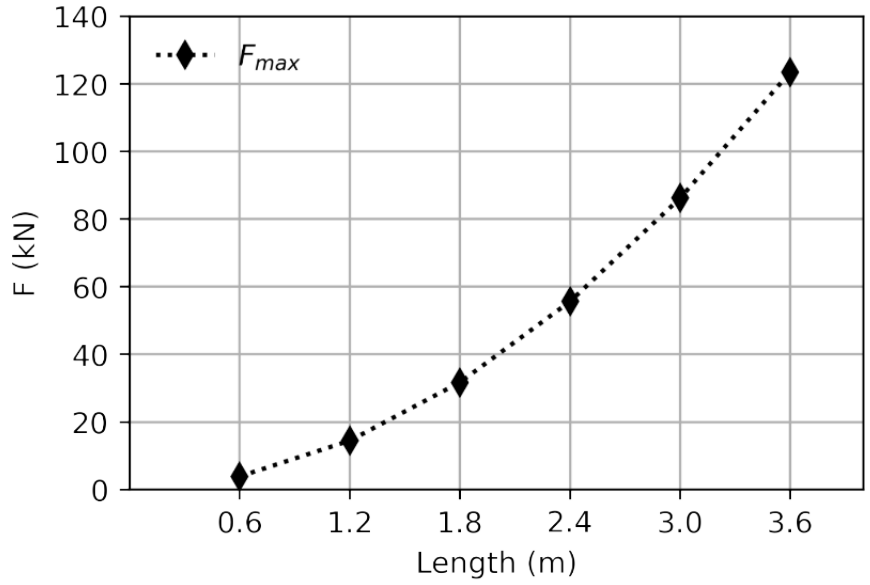
Connectors

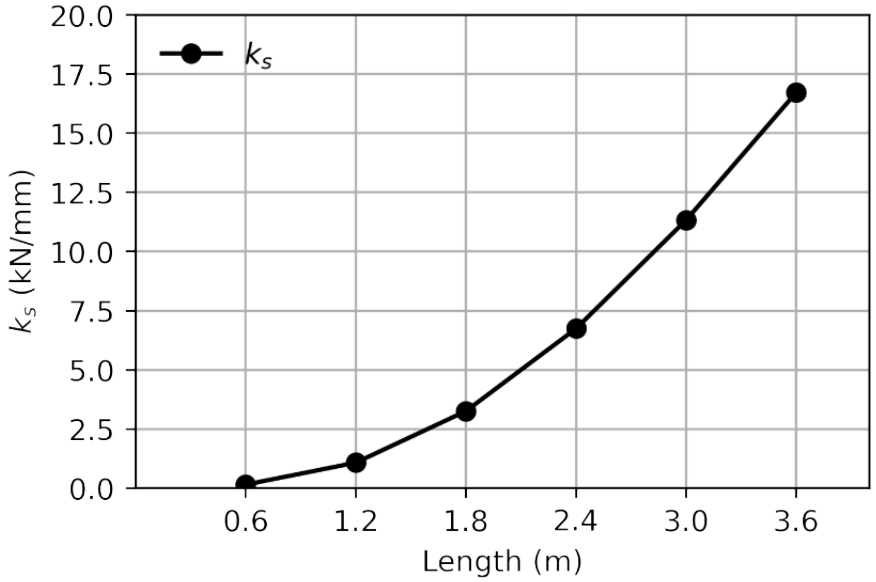
WikiHouse blocks are connected with each other by using bow tie connectors. Bow ties provide both shear and tensile resistance:

Vs (kN)	T (kN)	Ks (kN/mm)	Kt(kN/mm)
6.8	7.5	3	1.5

Walls

When jointed together, WikiHouse walls structurally behave as bracing walls. Their maximum and capacity and lateral stiffness depend on the the wall's length. Both capacity and stiffness increases proportionally to the amount of gravity loads carried by the wall.

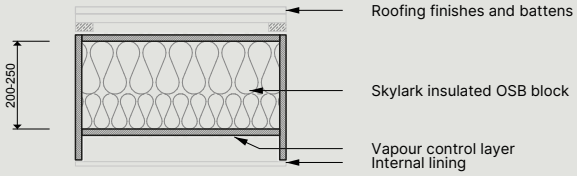




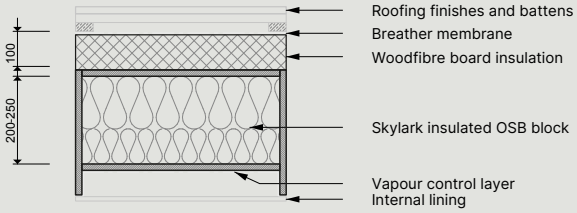
Thermal performance

ROOF

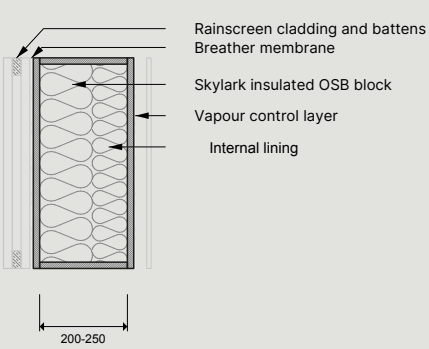
Basic

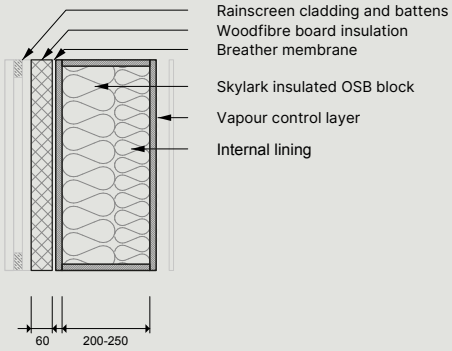


Plus

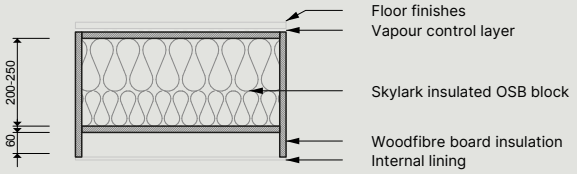


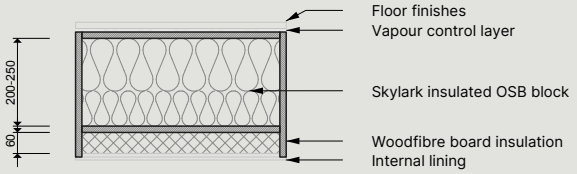
WALL





FLOOR





		Element	Heat transfer coefficient* [m2K/W]	Notes
Skylark 250	Basic	Roof	0.155	Standard 274mm internal batts insulation
		Wall	0.168	Standard 250mm internal batts insulation
		Floor	0.155	Standard 274mm internal batts insulation
	Plus	Roof	0.108	Standard + 100mm external woodfibre board
		Wall	0.123	Standard + 60mm external woodfibre board
		Floor	0.128	Standard + 60mm external woodfibre board
Skylark 200	Basic	Roof	0.207	Standard 200mm internal batts insulation
		Wall	0.207	Standard 200mm internal batts insulation
		Floor	0.207	Standard 200mm internal batts insulation

* Based on conductivity values λ of:
OSB panel: 0.13 W/mK
Rockwool insulation: 0.04 W/mK
Insulated woodfibre board: 0.038 W/mK

WikiHouse

Got questions?

Website www.wikihouse.cc

Contact us enquiries@wikihouse.cc

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