



BLUE SUMMIT
CONSTRUCTION

BUILDING HOMES, CREATING SMILES

STRUCTURAL INSULATED PANELS

HOW AND WHY TO BUILD
WITH STRUCTURAL
INSULATED PANELS



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WHAT ARE STRUCTURAL INSULATED PANELS (SIPS)?

SIPs are one of the most airtight and well insulated systems for residential and low-rise light commercial buildings - performing well above New Zealand Building Code requirements.

The strong prefabricated panels can be used for walls, roofs and floors and are available in a range of R-values (level of thermal resistance) and thicknesses.

SIPs are an alternative to timber 'stick' framing traditionally used in New Zealand, which unlike SIPs, have separate framing, bracing and insulation.

What are SIPs made of?

Manufactured and pre-cut in controlled factory conditions, the composite panels have an insulating core of high-density foam, e.g. expanding polystyrene (EPS) or polystyrene, bonded between two structural facings – usually oriented strand board (OSB).

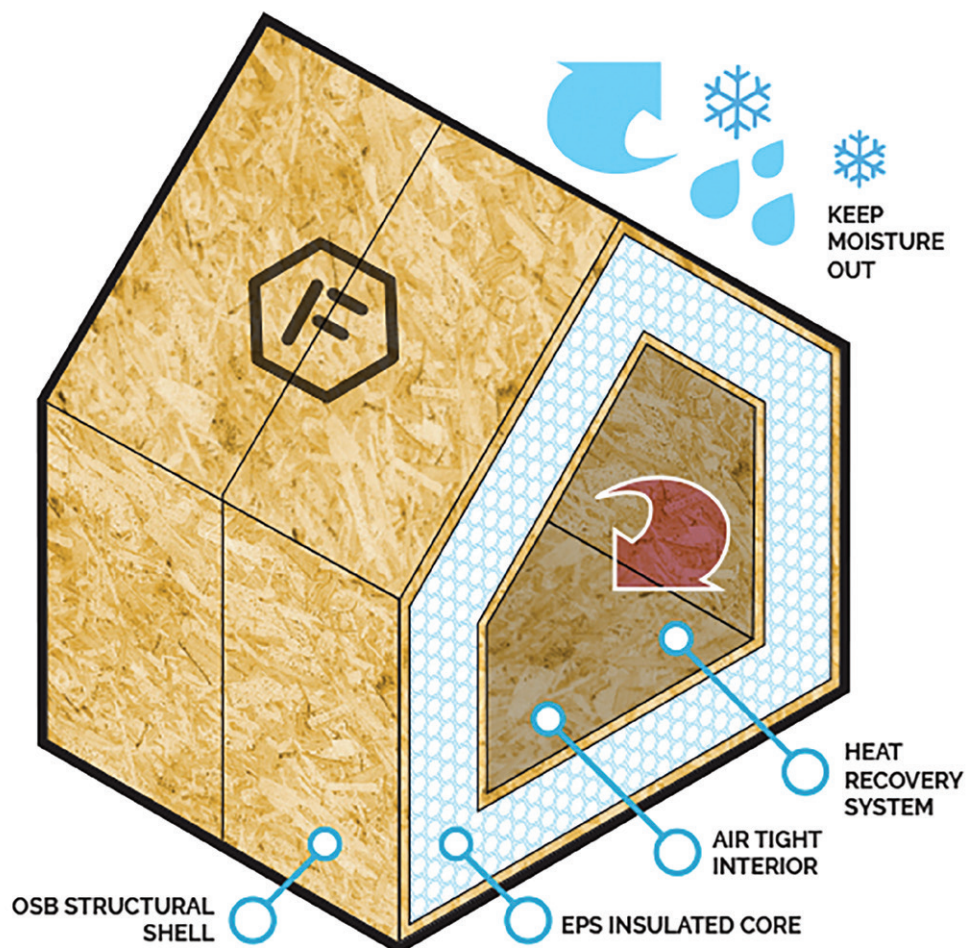


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BENEFITS OF BUILDING WITH SIPS

Building with structural insulated panels will mean your home is energy efficient, healthier to live in and stronger. Because the composite panels are prefabricated off-site, your home/extension will also be built faster.

Key Benefits

- Energy Efficiency
- Airtightness
- Superior Insulation
- Strength & Durability
- Faster Installation
- Seismic Resistance
- Sustainability
- Less Waste & Less Timber Used

SIPs create a durable thermal barrier - the solid inner foam core is impermeable to air.

In contrast, the cavities in standard timber 'stick' framing are prone to air leakage and convection – creating thermal bridges. In cold climates (particularly in the South Island of New Zealand), when air meets the rigid outer sheathing, condensation can occur. This can then create poor indoor air quality, mould growth and health problems for occupants.

SIPs overcome these issues by preventing moisture vapour from entering the structure from the inside. No moisture inside the structure means a healthier, more durable home.

Flexible design

Because SIPs are computer-designed and manufactured off-site, you aren't limited by design, size or shape. SIPs are also suitable for large, open plan areas. Your cladding choices aren't restricted and interior linings can be directly fixed to the panels. The interior structural facing of SIPs can also be left unpainted if you wish.

ENERGY EFFICIENCY

A home's building envelope also needs to control airflow and provide thermal resistance. The superior levels of airtightness and insulation provided by building with SIPs, significantly improves energy efficiency and will dramatically lower your heating and cooling costs.

**A HOME BUILT WITH
SIPS USES
50-75% LESS ENERGY!**

Significant energy savings

If you have always lived in conventionally built homes, get ready to enjoy the lowest energy bills you have ever had! Any potential upfront difference in the cost of SIPs (compared to standard timber framing), will soon be recovered through much lower heating and cooling costs.

Airtightness

Building with SIPs makes it far easier to achieve high standards of airtightness – potentially up to Passive House certification. To measure future performance of the house design, before your home is built, energy modelling can be undertaken and design adjustments made if required.

**CLOSE TO ZERO AIR
LEAKAGE**
**UP TO 90% LESS THAN
CONVENTIONAL TIMBER
FRAMING**

”

“More and more design professionals, builders and authorities are using SIPs to achieve Passive House standards - standards we believe all New Zealanders deserve.”

Nick Hubbard – General Manager, [Formance](#)

Airtight building envelope

In the New Zealand Building Code, the Ministry of Housing and Urban Development states that in regard to energy performance, airtightness of the building envelope is a key factor.

Renowned forensic engineer and building moisture control expert [Dr Joseph Lstiburek](#), has stated that in comparison to traditional stick frame walls which are prone to air leakage, convection and condensation, SIPs create a solid, homogenous, air impermeable barrier.

Ventilation - enhanced air quality

Because SIP buildings are extremely airtight, mechanical ventilation may be required to control air quality and temperature. A heat recovery ventilation unit will maintain a comfortable temperature, bring fresh filtered air in, dehumidify and expel stale moist air.

Natural passive solar gain

Blue Summit Construction places a high emphasis on building homes with superior performance and energy efficiency. For example, our [NEO Solar Homes](#) are low energy use homes encompassing all the basic principles of natural passive solar design. Our NEO homes are also built using SIPs and sleek, integrated solar panels.

Correct installation of SIPs is crucial for achieving airtightness. Ensure the building company you choose has training and experience with installing SIPs. The panels need to be installed plumb, square and true, and be sealed correctly.

Superior Insulation

High-performing insulation is a key component of an energy efficient home. SIPs are available in a range of high R-values which exceed New Zealand Building Code performance standards.

Reduces thermal bridging

The solid foam core in SIPs is impermeable by air – creating a thermal ‘break’ which lowers thermal bridging, and in turn, heating and cooling costs. Whereas over time, traditional forms of insulation (e.g. fibreglass batts) can be affected by compression and slumping – reducing the R-values, allowing air and moisture in through gaps and voids.

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“To be a truly energy efficient home, there should not be any thermal bridges in the foundation or building envelope ... Using SIPs creates an uninterrupted insulation that will maintain its stated R-value for the life of the home and outperform fiberglass insulation every time.”

Nick Hubbard – General Manager, [Formance](#)

Recyclable foam core

Unlike most conventional forms of insulation and other rigid foams, the solid polystyrene (EPS) foam core in SIPs is recyclable. SIP homes also have lower levels of CO2 emissions; whole-of-life studies showing as little as 10% of the CO2 emissions, when compared to a traditionally framed home.

What is R-value? Insulation materials are rated by R-value (or R-rating): the level of thermal resistance. Insulation with a higher R-value is a more effective thermal barrier - enabling the home to retain more heat, lowering heating and cooling costs.

What is a thermal bridge? An area or component with higher thermal conductivity than surrounding materials. This allows heat transfer in or out and increases the energy needed to heat and cool. Thermal bridging can also cause condensation and mould, particularly in cold climates.

STRENGTH AND DURABILITY

SIPs are exceptionally strong. The panels have structural facing on both sides - providing much greater bracing capacity than standard timber framing.

The panels are an ideal building system for New Zealand homes, including in regard to earthquakes, extreme weather conditions and high winds. SIPs are nailed and bonded at the joints, and are significantly more impact resistant than traditional stick framing.

Moisture control

Effectively controlling moisture is critical to ensure the durability of a house. A rigid air barrier on the outside of the external frame is not a good idea from a moisture control perspective. If the inside is not airtight, any moisture in the air is carried through the wall assembly, towards the outside.

Most rigid air-barriers are required to be sealed, so when moisture arrives at the outside of the building and meets the cold, it can condense and cause durability issues.

Higher load resistance

Compared to standard framing, SIPs have far greater resistance to axial, shear and out of plane loads. This also makes the panels an ideal building system for homes in earthquake zones.

Guarantee and Warranties

Halo 10 Year Residential Guarantee: As a Certified Builders approved builder, our work is fully guaranteed, and underwritten by Lloyd's of London. Halo is the most comprehensive 10-year residential building Guarantee available in New Zealand

Warranties: The minimum warranty in New Zealand for building products is 10 years. However Blue Summit Construction recommends using certified SIP brands with a **20-year** warranty. To meet the Building Code, SIPs must also remain functional for a minimum of fifty years.

FASTER INSTALLATION

SIPs are computer designed and accurately prefabricated under controlled factory conditions. The composite panels are relatively easy to work with, quick to install and can be put in place on-site by a truck loader crane.

The speed of installation significantly lowers labour costs and enables the building envelope to be closed in faster, to make the home weathertight. Tradespeople and contractors don't need to wait for interior cladding to be installed and can get to work sooner.

Erected in hours not days!

SIPs can be preassembled in panel sections of up to six metres, which means panels can be erected very quickly on-site. The panels don't need to be straightened on-site, which also speeds up build time.

Faster installation of services

Modern computer software means the prefabricated panels are manufactured to a very high degree of accuracy. This also means pre-cut channels ('chases') can be made in the foam core off-site - enabling easy installation of services on-site. E.g. Installation of electrical cable in flexible fibre glass rods.

Note: For plumbing, to avoid compromising thermal efficiency, we recommend plumbing is installed on internal framing walls, not through the foam core of SIPs.



SEISMIC RESISTANCE

SIPs are a suitable building system for homes in earthquake zones. The panels are not only strong, they're ductile: able to flex temporarily during earthquakes - reducing impact and potential damage.

Seismic design and construction

The risk of a home needing major repairs or remediation after an earthquake is reduced by building with SIPs. The structural strength of the panels enables them to withstand much higher loads than timber stick framing.

The lightweight construction of SIPs means that during an earthquake, walls move less, more slowly and for a shorter time - creating less shaking and internal damage.

Ductility: non-permanent flex

In relation to earthquakes, ductility is the degree of ability for a structure to undergo large deformation - i.e. to be able to flex temporarily without failing (collapsing).

The successful performance of SIPs during earthquakes has been evident internationally – e.g. after the 6.9 magnitude earthquake in Kobe, Japan (1995), and in New Zealand, after the 7.8 magnitude earthquake in Kaikoura (2016). SIPs are now commonly used in Japan for 'Low Damage Design' buildings, due to the frequency of earthquakes.

No damage at all... The house performed amazingly well in the earthquake. It rocked and rolled around a fair bit ... but I think that movement aided in having no damage, it felt like you were moving with the earthquake rather than against it.

Nigel - owner of home built with SIPs (Re: 13 November, 2016 Kaikoura earthquake)



SUSTAINABILITY

Less Construction Waste

Because SIPs are computer designed, efficiently and accurately prefabricated in controlled factory conditions, the amount of waste generated is substantially less than building timber stick framing on-site. This also means less waste disposal costs and helps create a safer site.

The foam cores in SIPs are non-toxic and are fully recyclable - unlike most other forms of insulation, such as fibreglass batts or polyurethane.

Less Timber Used

The structural facings in SIPs are made from OSB – oriented strand board. This is a less expensive, engineered wood made from fast-growing trees, grown in sustainably-managed forests.

OSB is comprised of compressed wood chips/strands and adhesives. The board is manufactured using a highly-efficient process which utilises a much higher percentage of each tree (up to 90%), than conventional timber framing.

SIPs Foam Core

The solid foam core in SIPs is usually EPS – expanded polystyrene foam. Only 2% of EPS is plastic – it is mainly comprised of air. EPS is made from polystyrene foam beads expanded by steam - a process with a lower CO2 emission per R-value, than fibreglass insulation.

The ongoing energy savings EPS insulation helps create, far exceed the energy used to make EPS. It also takes less energy to produce EPS than fibreglass insulation of equivalent R-value.

THE SIPs WE USE MEET STRICT FORMALDEHYDE EMISSIONS STANDARDS, DO NOT CONTAIN UREA FORMALDEHYDE ADHESIVES, OR ANY MEASURABLE AMOUNTS OF VOLATILE ORGANIC COMPOUNDS (VOCs).

DO SIPS COST MORE TO BUILD WITH?

Any potential upfront differences in cost are easily outweighed by the long-term performance, significant energy savings, strength and durability.

**SIPS OUT-PERFORM
CONVENTIONAL
BUILDING SYSTEMS
AND PROVIDE
50-75% REDUCTION
IN HEATING AND
COOLING COSTS!**

Comparing materials and labour costs

The cost of materials can be similar to standard timber stick framing. However, it is very important to take into consideration that in houses with conventional framing, bracing and insulation, thermal efficiency and R-values can decline – e.g. through insulation slumping, moisture and air infiltration.

Because SIPs are computer-designed, prefabricated and pre-cut offsite, the faster build times lower labour costs. SIPs also use less timber than stick framing, create less on-site construction waste and lower waste disposal costs.

What price do you put on your health?

The health benefits of living in an energy efficient, dry and warm home are incalculable - especially for babies, children, older people and people with illnesses. Housing-related illnesses - for example caused by living in a damp, mouldy home, can be avoided by building with SIPs.

Cost Estimate

Talk to us before working drawings are drawn up by an architect or architectural designer. We have a more accurate understanding of building costs and can advise whether there are any site challenges. If you already have a developed Concept Design, we can provide a Cost Estimate.



ABOUT US

Our team is trained and experienced in SIPs installation. Blue Summit Construction is a Licensed Building Practitioner and ACC Accredited builder. All our carpenters are Certified Builders and the entire Blue Summit team is Site Safe Accredited.

Halo 10 Year Residential Guarantee

As a Certified Builders approved builder, our work is fully guaranteed with the Halo 10 Year Residential Guarantee – underwritten by Lloyd's of London. Halo is the most comprehensive 10-year residential building Guarantee available in New Zealand. If you sell your house within 10 years, the Guarantee automatically passes over to the new owner.

We have an accurate understanding of building costs and can advise whether there are any site challenges, so talk to us before working drawings are drawn up by an architect or architectural designer. If you already have a developed Concept Design, we can provide a Cost Estimate. Prior to purchasing land, Blue Summit Construction can also assist with Land Feasibility Studies.

We know trust needs to be earned

For reassurance about whether Blue Summit Construction is the right building company for you, we can email detailed Testimonials and we have clients happy to speak to you about their experience of building with us.

Arrange a complimentary, no-obligation appointment.



CONTACT BLUE SUMMIT CONSTRUCTION

Find out more about SIPs and how we can help you with your new home or extension - contact us to arrange a complimentary, no-obligation appointment.

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