EXTEND HOW-TO GUIDE

EXTEND YOUR EXISTING HOME
THE STAND 47 WAY

SAINT-GOBAIN

STAND 47

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Whether building new or renovating an existing structure, creating a new home is a journey of discovering who you are, what you want, how you want to live and where you want to be. As with any journey, you'll want to do some research and plan your trip. You'll want to have a sense of what the end result should be and how much it'll cost. And while you'll no doubt be able to go it alone, having a seasoned and experienced guide show you the way will likely mean a more enjoyable, more enriching and overall better journey. This document offers practical steps and solution-directed information on How To Extend your home for Energy Efficiency the Stand 47 Way.

FIRST, SOME THINGS TO CONSIDER BEFORE YOU BEGIN...

CONSIDER YOUR EXTENDED HOME'S ACCOMMODATION SCHEDULE

An accommodation schedule is a summary of the number of people the home needs to accommodate. Since you have first-hand experience of your home and its requirements you'll know what the new renovation needs to accommodate for example, an extra bedroom, office, or services.

Consider how the extensions to your house can adapt and future needs may affect current needs so that they can potentially be flexible (for example, home offices or living areas that could convert into bedrooms and vice versa). Once you have a clear idea of the extra functions your home needs to perform, you're then ready to take the next step.

ESTABLISH A BUDGET

When forming your budget make a visit your bank's home loan section on their website and use their affordability calculators to assist in understanding how your budget can be shaped to your needs (and vice versa). Include everything that will go into the project: the cost of the land, local fees and taxes, architect and engineering fees, construction of not just the home but the landscaping, plus furniture and decorating. And don't forget a healthy contingency – renovations usually cost a lot more than expected. Make sure that these little surprises won't send you over the edge.

ASSEMBLE A TEAM AND GET BUILDING

While you might think you can manage a renovation on your own, assembling a team of professionals is the best approach. It gives you a chance to get some perspective.

The architect is often the first person you will hire to be involved in all phases of the building process. If necessary, they might also help you select and hire subcontractors, which can include the builders, engineers and landscape architects. One of the most important duties of an architect is to manage

and supervise most aspects of construction, as well as facilitate communication between all other contractors.

We suggest you choose an architect that has experience in Saint-Gobain products, energy efficient design and light steel–frame construction, and who must be registered with SACAP – The South African Council for the Architectural Profession. Stand 47 was designed by Thomashoff & Partners.

Alternatively, contact CPW – a specialist retailer in efficient construction who can assist in recommending a suitable architect, or indeed a range of qualified subcontractors. If you already hold plans, CPW can assist in having these priced using specialist materials and providers.

Discuss your accommodation plan and your wish to pursue contemporary construction methods with your architect. Request advice on the best approach to take and enquire about cost estimates for your planned build. Once you feel comfortable with the architect, we advise that a SAIA client/architect agreement is signed, protecting all parties.

Your design journey effectively starts now – you and your architect will go through a process to design your ideal home.

— Your architect will advise you whether it is necessary to appoint other professionals – a Quantity Surveyor (registered with ASAQS – The Association of South African Quantity Surveyors) or a Structural Engineer (registered with ECSA – Engineering Council of South Africa) might form part of the team.

— Your architect will submit your plans for Council approval. These are necessary for renovations.

— In collaboration with your architect you will need to appoint a building contractor and we recommend you include CPW in this process.

— Obtain at least three different quotations for building, from experienced contractors or alternatively embark on putting the construction project out to tender, advisedly under the guidance of your architect.

— Choose a contractor based on scope of work, references, budget and time frame and visit one or two examples of their contractor's previous work.

— Once you are agreed with the different contractors on the scope of work (the deliverables), the budget and the time frame, you will need to draw up a contract that legally binds the parties thereto, prior to commencing with construction. This needs to be done with the quantity surveyor and the architect.

— You may also need to enlist the services of a Light Steel Frame supplier that is registered with SASFA – The South African Light Steel Frame Building Association.

SECOND, THINGS TO CONSIDER AS YOU DESIGN YOUR RENOVATION...

WHAT ARE THE BENEFITS OF BUILDING WITH SAINT–GOBAIN MATERIALS?

Your existing home may be built with bricks and mortar, and that is fine. Saint-Gobain products can be used with your existing structure and your additions can use brick or drywalling. Either way, there are many benefits to extending your home in the Stand 47 way using Saint-Gobain products (Read more on our Build How To Guide):

— **Thermal comfort** – when used within building structures provide highly effective thermal insulation within an airtight building envelope that limits high internal temperature variables, such as summer overheating, and winter heat loss.

— **Acoustic comfort** –provide high acoustic isolation limiting the transfer of airborne, impact and reverberation sounds through the building structure

and the spaces without being disturbed by unexpected noise.

— **Flexibility, adaptability and maintenance ease** – modular systems mean buildings can be built faster and produce less site waste, decreasing energy consumption, carbon footprints and running costs. They require little maintenance and future renovations are easier to perform– with minimal inconvenience to the user.

Saint–Gobain drywall materials offer innovative design flexibility; versatility and aesthetic appeal by hiding messy and unattractive services inside the drywall cavity.

Lightweight building systems save on foundation costs and reduce structural load. Construction time saving is possible, while other construction costs decrease. This means a cleaner and potentially safer construction site is possible with neater and more accurate installation finishes.

— **Visual comfort** –products also offer aesthetic solutions that promote the use of natural light while considering glare and luminance to provide a stimulating environment, high quality spaces.

— **Indoor Air Quality** – products include a high performance board that improves indoor air quality by taking formaldehyde and other toxins out of the air and converting them into safe, inert compounds.

— **Peace of mind** – not only has Saint–Gobain (Gyproc) been around for 85 years, but our proudly South African products are locally sourced and manufactured, whilst our systems are SABS tested and SANS compliant.

— **Sustainability** – Saint-Gobain is committed to meeting this need by creating a sustainable habitat for future generations in South Africa. They are the first local manufacturer to complete a unique critical Life Cycle Assessment (LCA) on their products to measure the environmental impact of a product in every stage of its life. Environmental impact is reduced through:

- responsible sourcing of raw materials which protect and sustain the environment,
- reducing energy consumption during production,
- reducing production waste to landfills,
- championing light weight building solutions that reduce transportation,
- active involvement promoting sustainability in the industry. Saint-Gobain Gyproc is a founding member of the Green Building Council of South Africa (GBCSA).
- Innovative technology – As an example, Saint–Gobain Gyproc plasters use less water than sand cement plasters. In the case of drywall systems, and Aerolite in ceiling installations is that it is made from sustainably sourced naturally occurring silica sand with up to 80% recycled glass being used in the glasswool making it environmentally friendly.

HOW TO MAKE YOUR HOME ENERGY EFFICIENT WITH SAINT-GOBAIN MATERIALS

The first step in making your home energy efficient is to reduce energy consumption. In addition to using energy efficient electrical systems to reduce electricity consumption, it is essential to get the basics right. Correctly designing the house's orientation and shading, can naturally maximise heat gain from the sun in winter without overheating the building in summer.

Any building with a temperature difference between internal and external temperature results in heat loss or gain. The building envelop should be designed to reduce heat transfer. Savings are maximised by reducing air leakage, avoiding thermal bridging, and reducing the risk of condensation. Thermal insulation and other design measures improve thermal comfort by cutting heat loss or gain and so conserve energy for heating and cooling, and reduce costs.

South Africa's local energy efficiency building standards specify the minimum levels of thermal performance

required for the building envelope - external walls, windows, ceiling or roof and floors. Thermal comfort improves where internal temperatures are kept constant therefore, heat storage is just as important as heat transfer. Saint-Gobain has a range of product solutions than can be applied to reduce typical heat loss and heat gain in your future home.

WHERE CAN MY ARCHITECT SPECIFY SAINT–GOBAIN MATERIALS AND SYSTEMS IN MY ENERGY EFFICIENT HOME OF THE FUTURE?

Often with renovations you plan to add a room and end up renovating the whole home. That is because a house is an integrated system, and it makes sense to improve all of it rather than just a portion, especially when aiming for energy efficiency. In renovations and home extensions, Saint-Gobain products and materials offer a variety of beneficial products that can integrate with your existing home's structure, materials, size or shape. Speak to your architect about t Saint-Gobain products which can provide durable sound, fire and moisture resistance, whilst cleaning the air from impurities and truly turn your home into a home of the future.

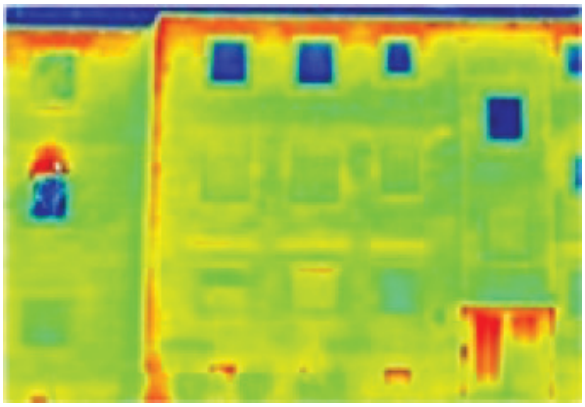
Roof and ceiling - Depending on the geometry of the house, roofs and ceilings account for between 25 and 45% of heat gain or loss. As a result of poorly insulated roofs, occupants inside experience cold rooms in winter and overheated ones in summer. Good roof insulation ensures comfortable thermal and acoustic benefits all year round, and it also offers the best cost to benefit ratio; higher energy efficiency can be achieved with minimal costs. It therefore takes priority in thermal insulation.

An insulated ceiling is often considered a luxury, however to properly insulate the ceiling in a typical home costs less than 1% of the total per square meter building costs, but is one of the few building materials that will save you money for the lifespan of your home.

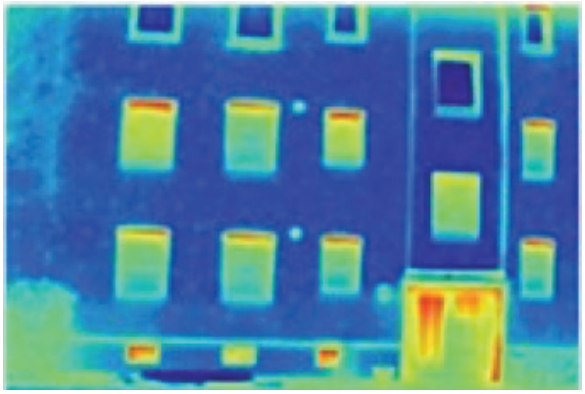
Consider installing:

- Saint-Gobain RhinoBoard - provides versatile, distinctive aesthetics that will improve the thermal performance of a roof assembly by 60%.
- Saint-Gobain's Isover Think Pink Aerolite – a thermal and acoustic ceiling insulation laid on the ceiling reduces the amount of energy required to maintain a comfortable living environment and offers a payback in less than 2 years. Aerolite Approved Installers link (www.isover.co.za/approved-installers).

Walls - Outer walls in a house and can account for up to 30% of heat loss and gain. It is advisable to increase the insulation properties of your building envelop by increasing the wall thickness or using a material with low thermal conductivity (thermal insulation). Building a thick wall is costly, and cannot achieve the same energy savings as a thin layer of thermal insulation.



Un-insulated home: Heat loss through the walls and windows.



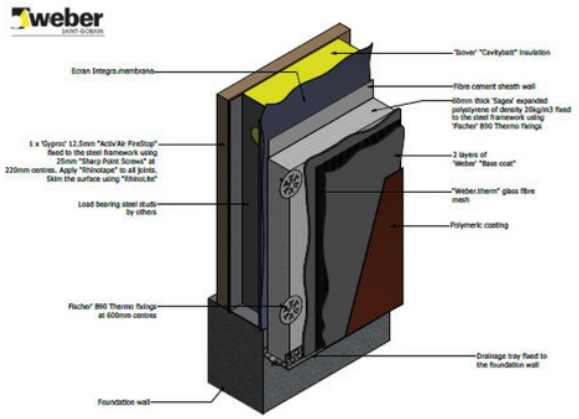
Insulated home: Heat loss predominantly through windows - reduced heat loss through the building envelop.

Adding thermal insulation to walls depends on the wall construction of the new home and its design. You can use Saint-Gobain systems in a hybrid system using bricks and drywalls (See our How To Retrofit Guide) or you can use it in a light steel frame building using drywalls as we did in Stand 47.

Since you are building a home of the future, we recommend using Saint-Gobain's ETICS (External Thermal Insulation Composite System), the high quality thermal wall insulation system:

ETICS is fitted to a steel frame designed by a structural engineer, consisting of an internal lining of 1 - 2 layers of a Saint-Gobain RhinoBoard (as per fire rating requirements) and finished as desired. The external lining consists of a moisture barrier membrane (Saint-Gobain 'Ecran Integra.membrane') which is fixed to the steel frame. A sheath wall is then fixed to the frame and insulation boards (Sagex Expanded polystyrene panels) are adhered to the sheath wall using adhesive and mechanical fixings as specified by Saint-Gobain.

Apart from significant savings in running costs, ETICS makes the construction process easier and provides a viable construction method for home owners looking to lower their construction times, and improve thermal efficiency during habitation. ETICS systems are said to be 84% more thermally efficient than conventional wall systems.

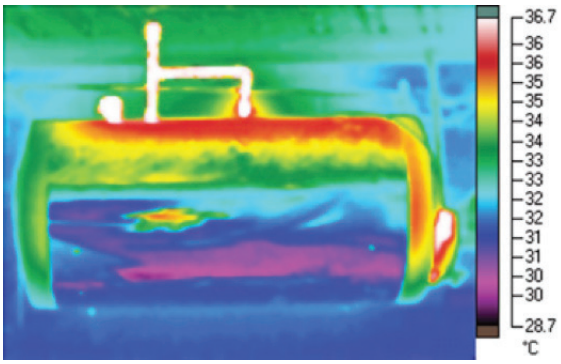


Floors and foundations - A substantial amount of heat is lost through the foundations and floor into the ground. Floors with under floor heating should have insulation installed. Heating elements can be installed above Saint-Gobain's expanded polystyrene insulation. If the floor is not heated, it is more economical to insulate the foundation walls where heat loss is greatest. Saint-Gobain's expanded polystyrene can be used as under as floor and perimeter insulation.

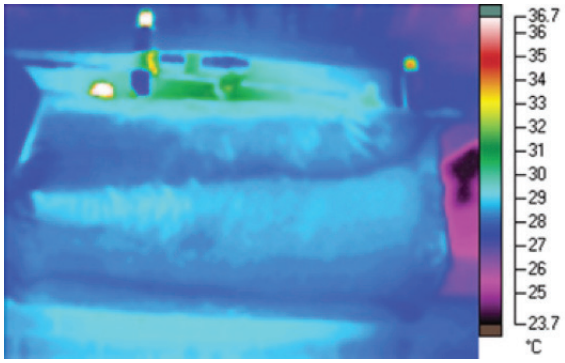
Another option is to install a light weight insulated screed using Saint-Gobain's Politerm Blu, which is a thermal insulation mortar consisting of EPS beads treated with a chemical additive to enable the production of lightweight, thermal insulation mortars of various densities. Politerm Blu is non-flamable and environmentally friendly as it uses less material or energy, produces fewer emissions, and does not contribute to global warming or the depletion of the ozone layer.

Insulating services - A geyser consumes 35% of a typical household's electricity and this can be reduced by 37% by insulating the geyser's adjoining hot water pipes. By insulating both your geyser and pipes you can save up to 58% of the running costs, with payback within 6 months.

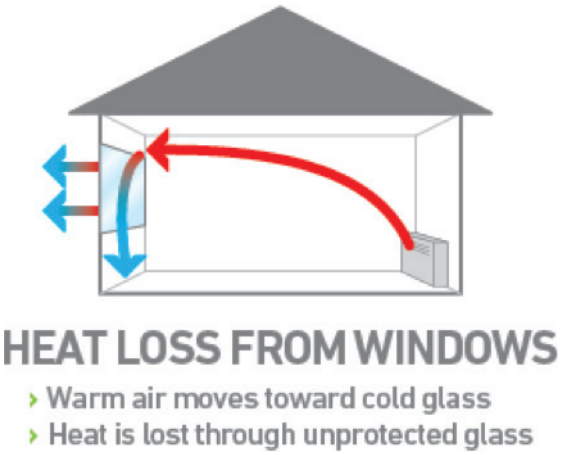
Saint-Gobain's Geyser Insulation Pack consists of a flexible foil faced Glasswool insulation blanket with tape and five 1 metre snap on pipes, which exceed requirements.



Un-insulated geyser



Insulated geyser



Air leakage - This occurs around exterior doors, windows, junction between the ceiling and the wall, expansion joints and service penetrations. To prevent heat gain or loss, seal gaps using an elastic sealer and a "door sweep" at the bottom of entrances, and install cornices at the ceiling perimeter such as Saint-Gobain's cove cornice.

OTHER GUIDELINES TO CONSIDER WHEN BUILDING FOR ENERGY EFFICIENCY:

WINDOWS

A single pane of glass can lose almost 10 times as much heat as the same area of insulated wall. It would be a worthwhile to consider installing double pane, low-e coating windows to reduce the transfer of heat through windows.

Low-emissivity (Low-E) coatings are microscopically thin, virtually invisible, metal or metallic oxide layers on a glazing surface primarily to reduce the U-factor by suppressing radiative heat flow. Low-E coatings are transparent to visible light, and opaque to infrared radiation. Different types of Low-E coatings have been designed to allow for high solar gain, moderate solar gain, or low solar gain.

REDUCED WINDOW TO WALL RATIO

The correct balance between glazed and wall surfaces in the external façades maximizes daylight while minimizing unwanted heat transfer, resulting in reduced energy consumption.

EXTERNAL SHADING DEVICES

External shading devices on the building façade protect windows from direct sunlight, which increases both solar heat gain and glare. Designs that take advantage of summer and winter sun should be considered.

NATURAL VENTILATION

A well-designed natural ventilation strategy can improve occupant comfort by providing both access to fresh air as well as reducing the temperature. This results in a reduction of the cooling load, which lowers

initial capital and maintenance costs.

HEAT PUMP FOR HOT WATER

Heat pumps for hot water use electricity to transfer heat from the air to water in an enclosed tank instead of generating heat directly.

ENERGY SAVING LIGHT BULBS

The use of CFL (compact fluorescent lamps), LED (light emitting diode), or T5 lamps reduces the building's energy use for lighting; heat gains are lowered, which in turn reduce cooling requirements. The service life of these types of bulbs is generally higher and maintenance costs are reduced.

SOLAR PHOTOVOLTAICS

Installing solar photovoltaic panels reduces the amount of electricity required from the grid. Photo Voltaic panels unlock the latent potential inherent in every building's roof space to generate clean renewable energy from the sun.

SMART METERS

Reduce energy demand through increased awareness of energy consumption. Appreciate, understand, and contribute to responsible use of energy in your home. Smart meters provide immediate feedback that can result in 10 to 20% energy savings, as they are able to identify consumption in more detail than with conventional meters.

NEED MORE INFO OR ARE YOU READY TO BUILD?

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