

RETROFIT **HOW-TO** **GUIDE**

RETROFIT OR REFURBISH YOUR
HOME FOR ENERGY EFFICIENCY
THE STAND 47 WAY

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You can retrofit your existing brick and plaster house with energy efficient materials and systems from Saint-Gobain, and thereby reduce the expenses related to heating and cooling your house for thermal comfort, as well as heating hot water geysers, by up to 30%. We suggest that you contact CPW (details at the end) - a specialist provider in efficient building materials who can assist in reviewing your plans or home and compile a cost estimate and a list of subcontractors to assist with your renovation.

SO YOU WANT TO RETROFIT. CONSIDER THE GUIDELINES BELOW TO ENSURE IT IS A SMOOTH AND SUCCESSFUL PROCESS:

Right size your retrofit to an energy efficient home to suit your current and future needs.

Take the time to explore the details that will bring delight to your day-to-day experience as you use your “new” home.

Often the trick to managing a retrofit project is knowing when to say ‘enough’. It’s really easy to go beyond what you initially thought would be the project, because everything in a house is so interconnected. Unless you have the funds and the desire to tackle the whole house at once, take it in stages. And make sure you have a game plan, so you know what the end result will be.

However, sometimes tackling the whole house is unavoidable and it just makes a lot of sense to bring everything up to current standards. This is especially true for older homes where improvements to heating, cooling, plumbing, electrical, roofing and structural systems just might be necessary before tackling the

fun stuff anyway. It makes no sense to have that dream kitchen if you can’t keep the house warm in winter.

Make decisions early and often: You can never plan too much when it comes to a renovation. It doesn’t matter if the project is to be done all at once or over several years. Think of the project as an excursion. Sure, you can just land in a foreign country and figure it out as you go, but chances are you’d have a better time at a lower cost if you plan your trip beforehand. The same applies to a home renovation. You’ll definitely have a better experience by making decisions early and not changing things in the midst of construction.

Hire the best contractor you can afford. A good contractor will have relationships with all of the subcontractors and tradesmen in the area. You will possibly pay a little more, but your project will be finished with quality and on-time.

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

— **Thermal comfort** – a quality building has comfortable internal temperatures within an airtight building envelope. Saint-Gobain products used within building structures provide highly effective thermal

insulation in an innovative way that limits high internal temperature variables, such as summer overheating, and winter heat loss.

— **Acoustic comfort** – Saint-Gobain systems provide high acoustic isolation limiting the transfer of airborne, impact and reverberation sounds through the building structure and the spaces contained therein. Sound absorbing wall and ceiling systems add significantly to indoor acoustic quality where users are ensured of privacy and quiet without being disturbed by unexpected noise.

— **Flexibility, adaptability and maintenance ease** – because Saint-Gobain products use modular systems, buildings can be built faster and produce less site waste. This responsible approach decreases energy consumption, carbon footprints and running costs. Furthermore, these durable systems require little maintenance and future renovations are easier to perform since modular systems are flexible and easily adapted, removed or added to without compromising the entire structure, building form or the aesthetic – with minimal inconvenience to the user.

Saint-Gobain drywall materials offer innovative design flexibility; versatility and aesthetic appeal by hiding messy and unattractive services like plumbing and electrical conduits inside the drywall cavity. This results in healthy, visually stimulating, positive and productive interior spaces.

Lightweight building systems save on foundation costs and reduce structural load. Construction time saving is possible, while other construction costs such as transport and cranes decrease. This means a cleaner and potentially safer construction site is possible (in comparison to brick and mortar), with neater and more accurate installation finishes.

— **Visual comfort** – with technological innovation and efficiency requirements met, Saint-Gobain products also offer aesthetic solutions that promote the use of natural light while considering glare and luminance. Natural light provides a stimulating

environment which when combined with clean modern lines and premium finishes create extraordinary high quality spaces.

— **Indoor Air Quality** – From a health point of view, Saint-Gobain 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 to produce the required acoustic performance and fire resistance. If installed correctly, systems produce consistent results for areas that have stringent performance requirements.

— **Sustainability** – as South Africans are becoming more environmentally responsible, 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 - from raw material stage through 5 stages to the end of its life cycle. 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, Saint-Gobain Isover's cavity insulation

material is a self-supporting non-combustible (SANS 10177-5) glasswool insulation. It is glass tissue faced and offers effective thermal insulation with a k-value (thermal conductivity) of 0.038 W/mK. Due to its density, it also offers efficient sound insulation. An added benefit of using 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. In addition, Aerolite is non-combustible and ensures preventative fire protection.

HOW TO RETROFIT MY HOME WITH SAINT-GOBAIN MATERIALS THE STAND 47 WAY?

You love your home and have no intention of moving, but you realise you need to retrofit it to add a room or two, and make it more suited to your needs. If you are seeking to improve the energy efficiency of your home and its the thermal comfort, know that it is possible to save between 60-90% of energy usage if the whole building were refurbished to meet to legislative guidelines.

Not only does it make your home more comfortable by stabilising the temperature, a consistent temperature means a decrease in the consumption of power and hence a decrease in the cost of heating or cooling the house. Efficient power usage saves you money, and it saves the environment by reducing greenhouse gas output.

When planning to retrofit your home, understand where heat loss and gain typically occurs in a building. Saint-Gobain has a range of product solutions than can be applied to reduce this.

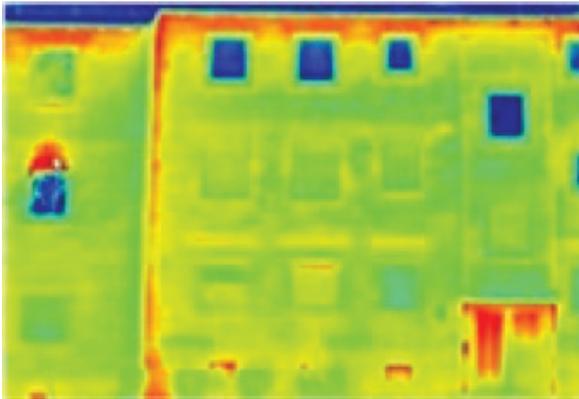
Roof and ceiling - Depending on the design, roofs and ceilings account for between 25 and 45% of heat gain or loss as a result of poorly insulated roofs. Good roof insulation ensures comfortable thermal and acoustic benefits for you all year round, and offers the best cost to benefit ratio; higher energy efficiency can

be achieved with minimal costs. An insulated ceiling is often considered a luxury, however to properly insulate one costs less than 1% of the total per square meter building costs. This will save you money for the lifespan of your home.

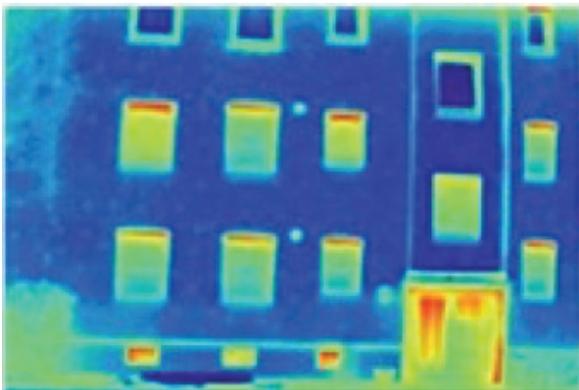
Consider installing:

- 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 \(www.isover.co.za/approved-installers\)](http://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.

The possibility of adding thermal insulation to walls depends on the wall construction of your home. You can use Saint-Gobain systems in a brick home or you can use it in a light steel frame building using drywalls only (See our Build How to Guide for more on ETICS walls).

The following options are available depending on your brick home:

1. Insulation can be installed on the inside of a brick wall by way of dry-lining. To dry line, a drywall framework is installed on the inside of a brick wall and lined with RhinoBoard and Saint-Gobain glass wool insulation is installed in the cavity. The advantage is

that the drywall framework offers space for installation of services in the cavity; an opportunity to easily update technology, fix any wall imperfections and reach better sound insulation.

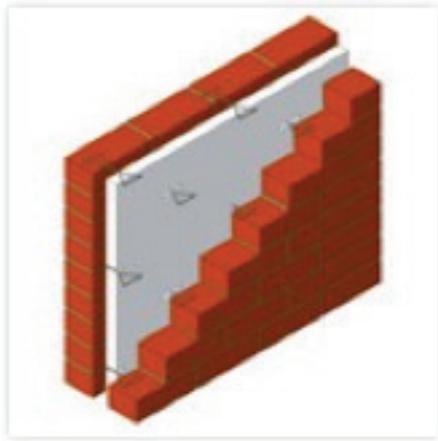
In certain climates e.g. the Southern Cape Condensation Zone, it is important to monitor moisture, because the outer walls will be comparatively colder than the internal walls with this system resulting in moisture accumulation inside. To avoid damage caused by condensation it is advisable to install an air tight vapour membrane or barrier (a plastic or foil sheet) on the room facing (internal) side.

For more information, download the Saint-Gobain drylining booklet here: <http://www.gyproc.co.za/media/68715/drylining.pdf>

2. Thermal insulation such as Saint-Gobain's expanded polystyrene (EPS) sheets can be installed on the outside and covered with plaster coat. An advantage is to prevent thermal bridges (materials that are poor insulators, allow heat to flow through them, significantly reduce the effectiveness of thermal insulation).

Structural thermal bridges might occur around windows; doors and unheated parts of the building. Insulation of the outer walls is therefore directly connected to the frame of the windows and doors and should overlap adjoining cold parts of the building.

In addition, cavity walls built with two brick or concrete block rows at 50mm distance from each other can be insulated with Saint-Gobain expanded polystyrene insulation inside the cavity.



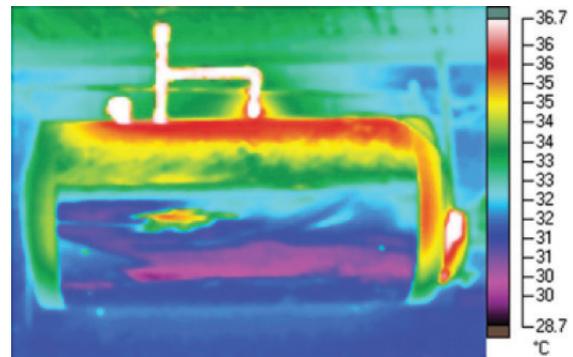
Floors and foundations - A substantial amount of heat is lost through the foundations and floor into the ground. Floors with under floor heating should have insulation installed. Heating elements can be installed above Saint-Gobain’s expanded polystyrene insulation. If the floor is not heated, it is 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-flammable 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.

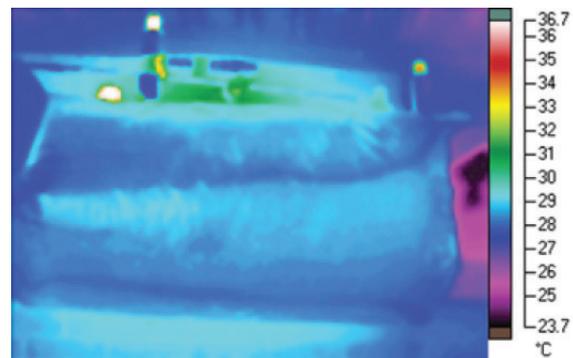
Insulating services - A geyser consumes 35% of a typical household’s electricity and this can be reduced by 37% by insulating the geyser’s adjoining hot water pipes. By insulating both your geyser and pipes you can save up to 58% of the running costs, with payback within 6 months.

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



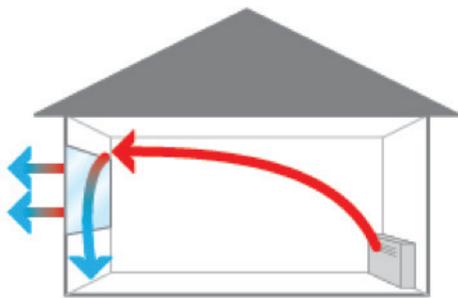
Insulated geyser

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.



HEAT LOSS FROM WINDOWS

- › Warm air moves toward cold glass
- › Heat is lost through unprotected glass

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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