



Technical Guide

Tipperary Energy Agency and North Tipperary County Council wish to acknowledge the input to this guide from Sustainable Energy Ireland's Home Energy Saving scheme and Greener Homes Scheme Technical Guide

This Technical Guide may be revised periodically. Call 067 44671 or visit www.servecommunity.ie to ensure you have the latest version.



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1. Roof Insulation:

Key Roof Insulation Facts and Tips

Up to 30% of the heat produced in your home may be escaping if your roof is insulated. Ceiling level roof insulation is generally the most cost effective of any energy efficiency upgrade made to a house and often does not come with a large price tag when the potential savings are considered.

Even if you already have insulation in your roof, you may still be losing heat if it is damaged, less than is necessary or incorrectly installed. For example if you have a thin or worn layer of insulation it would be beneficial to replace it or improve its performance by adding another layer.

The Benefits of Roof Insulation

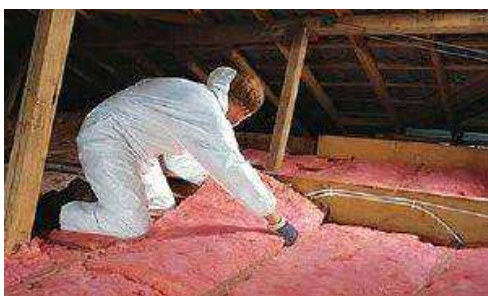
- Reduction in heating bills
- Increased comfort levels
- Low capital cost
- Short payback periods
- Reduction in Greenhouse Gas emissions

What is a U Value?

The effectiveness of an insulating material is measured using a 'U-value'. A U-value is a measure of how much heat is conducted through a material. Insulation installed correctly will have a low U-value as it will allow only small amounts of heat to pass through, thereby keeping your home warm. Homeowners availing of attic insulation grants under the Home Energy Saving scheme and the SERVE Energy Efficiency Grant Scheme should aim to achieve a U-value of 0.13 W/m K or better (i.e. lower). It is vital that you ask the installer that the price quoted for will achieve the required U-value, or the best U-value that can be achieved in your circumstances.

1.1 Ceiling Level Roof Insulation:

If you have a pitched roof with an attic space, one of the simplest ceiling insulation methods is to lay a quilt (Mineral Fibre, Glass Fibre, Hemp, Sheepswool materials are all capable of satisfying the performance requirements of the scheme). If this type of material is to be used, it is important to ensure that the quilt is installed in two layers and in two directions in order to ensure the maximum benefit is achieved. There are many other products that can insulate effectively at ceiling level. Where your contractor suggests that one of these products is the best for you, have him explain in detail the benefits and standards associated with the product. If you are considering using a "multifoil" insulation in conjunction with another insulation material, it is important to check any installation requirements with the supplier. Contractors who blow in insulation generally can perform the task in a significantly shorter time frame and therefore often cost less to complete the installation.



Installation of Fibreglass insulation



View of blown cellulose insulation.

Attic Storage

Compression can cause an insulating material to lose some of its insulating properties. It is therefore important, where possible, to minimise the amount of items stored in the attic which may compact or compress the insulating material. Where storage is required, laying a second roll of insulation (above the joists) is impractical and in this situation, try to make certain that the storage area set aside is located over an area of the house which has a lower heating requirement, e.g. over bathrooms as opposed to the living/sitting room. Alternative arrangements like raised storage areas above the level of the insulation could also be discussed with your Contractor.

Insulation Integrity

Installing insulation properly is very important. Where insulation is installed between joists, it is important that it is cut tight and is installed with no gaps. Gaps between the insulation will cause it to become less effective as heat loss will occur in these areas.

Ventilation

Adequate ventilation is important in an attic to help prevent damp or mould from occurring. It is therefore important to ensure ventilation openings at the eaves of the house are left unblocked after installation of your insulation.

Water Storage Tanks and Pipes

When an attic is insulated at ceiling level, its temperature is reduced, as most of the heat previously lost from the house through the attic is now being kept within the house. Therefore, it is necessary to insulate the water tank and pipes to ensure that they will not freeze during cold weather. This will also help to minimise heating costs associated with heating water.

Walkway

Your insulation contractor should install a permanent walkway in your attic to ensure you have easy access to cold water tanks or other fitted appliances.

1.2 Room in Roof / Flat Roof Insulation:

Over the last few decades many Irish houses were extended by either a flat roof extension to the rear of the property or a dormer type extension into the roof space. The level of insulation in these extensions is generally to a poor standard in comparison to the 2008 building regulations. Final U value should be $0.12 \text{ W/m}^2 \text{ K}$ or as near as practically possible.

1.2.1 Flat Roof:

When installing extra insulation in a flat roof, the ceiling will more than likely need to be replaced. The majority of installers will fit rigid insulation (such as high density polystyrene or Polyiso insulation (kingspan, xtratherm, quinntherm, frametherm)) between the roof rafters, and install an insulated plasterboard slab for the ceiling. This typically will result in a slightly lower final ceiling height and care must be taken to ensure that:

- the final ceiling height is not below existing or 2.4m whichever is the lower.
- that there is adequate ventilation over the insulation on the underside of the roof felt. A gap of 50mm must be maintained.

1.2.2 Dormer Roof: (Room in Roof):



Dormer roofs are typically installed in attics after the main house is constructed. The level of insulation is often poor, and therefore the room often is too cold in winter and too warm in summer.

When installing extra insulation in a dormer roof, the ceiling will more than likely need to be replaced. The majority of installers will fit rigid insulation (such as high density polystyrene or Polyiso insulation (kingspan, xtratherm, quinntherm, frametherm)) between the roof rafters, and install an insulated plasterboard slab for the ceiling.

The typical installation in a room in roof (dormer type) is made up of two layers.

- The first layer is made up of insulation in the rafters, with a 50mm gap between the insulation and the roof felt.
- The second layer is generally made from an insulated plasterboard slab, where the insulation is bonded directly onto the plasterboard with a vapour barrier built into it.

It is vital that you ask the relevant installer to ensure that the quotation provided is for an installation which achieves a U-Value of $0.16 \text{ W/m}^2 \text{ K}$ or as near as is practicably possible.

2. Wall insulation:

Key Wall Insulation Facts and Tips

An un-insulated or poorly insulated wall costs you money and harms the environment. On average, a home loses 20 - 30% of its heat through its walls and even more if they are not properly insulated. Even if you already have wall insulation, you may still be losing heat if it is damaged, less than is necessary or incorrectly installed.

The Benefits of Wall Insulation

- Reduction in heating bills
- Increased comfort levels
- Reduction in greenhouse gas emissions

Effectiveness of Insulation

The effectiveness of an insulating material is measured using a 'U-value'. A U-value is a measure of how much heat is conducted through a structure. Correctly installed insulation will have a low U-value as it will allow only small amounts of heat to pass through, thereby keeping your home warmer for longer. Homeowners availing of wall insulation grants under the Home Energy Savings scheme are required to install wall insulation which should achieve a U-value of 0.27 W/m K or better (i.e. Lower). It is vital that you ask the installer that the price quoted for will achieve the required U-value or the best U-value that can be achieved for your circumstances.

Wall types

The first step in getting wall insulation is establishing the wall type of your home. The main types are cavity walls, solid walls and hollow block walls. A building contractor or architect will be able to tell you what type of wall your home has if you don't already know yourself.

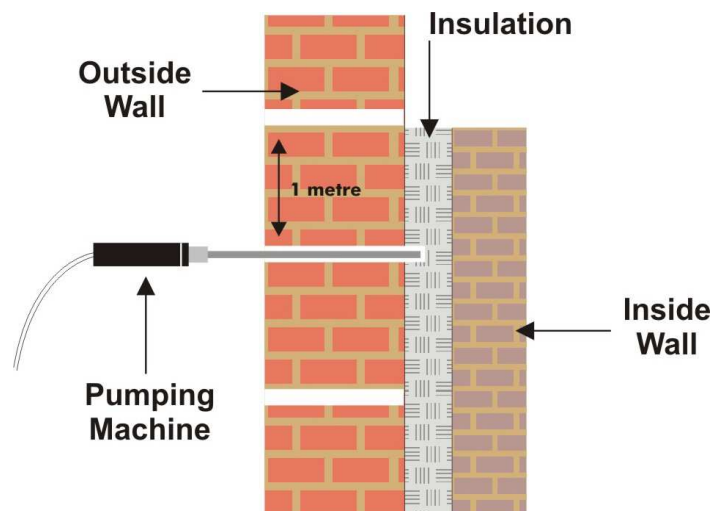
Wall insulation types

There are three main types of wall insulation, which suit different walls and homes:

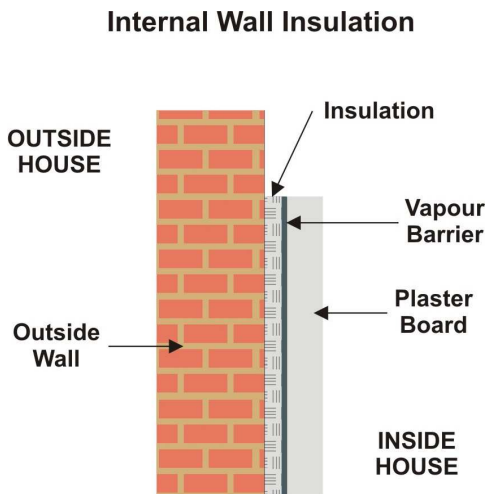
- A) Cavity wall insulation
- B) Internal insulation
- C) External insulation

2.1 Cavity Wall Insulation:

A cavity wall consists of two rows of brick or concrete block with a cavity or space between them. Injection of insulating product from the outside is the best method for insulating this type of wall. Filling extra or top up insulation in addition to existing insulation is recommended if the insulation material is compatible. Most Irish houses have white low density polystyrene which is compatible with the grey high density polystyrene.



2.2 Internal insulation:



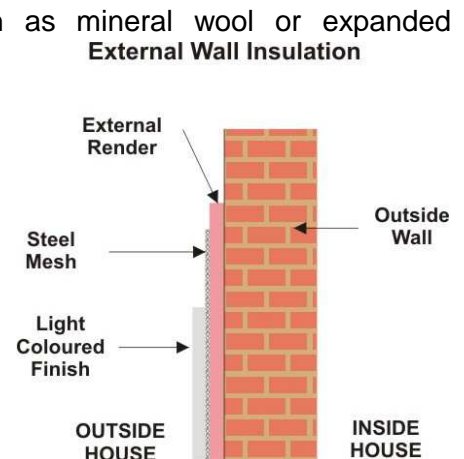
If your home is built using solid wall or hollow block construction methods, cavity fill insulation is not an option. Internal insulation (sometimes referred to as 'dry-lining') involves fixing insulation to the inner surfaces of your external walls. This usually involves fixing an insulation board to the walls and covering it with a vapour barrier and plasterboard. One of the main disadvantages of internal insulation is the loss of room space; this may be minimised by using high performance insulation products that are thinner. While this is often a more affordable option than installing external wall insulation, the loss of space and potential necessity to take out and re-fit fitted kitchens and appliances can result in people choosing the external insulation option. The External insulation option is also more favourable as it eliminates risk of condensation and thermal

bridging.

2.3 External insulation:

External insulation involves fixing insulating materials such as mineral wool or expanded polystyrene slabs to the outer surface of the wall. The insulation is then covered with a special render to provide weather resistance. A steel or fibreglass mesh is embedded in this render to provide strength and impact resistance. External insulation is an expensive solution; however additional problems (other than poor levels of insulation) suffered by some homes such as rain penetration, poor air tightness or frost damage can be solved by an external insulation system, provided that the product is NSAI Agrément certified.

The SERVE grant scheme aims to further improve the target U-value of external wall insulation through additional grant support. See Section 3 of the Information Guide on grant levels and requirements.



3. Heating Controls:

Key Heating Controls Facts and Tips

Effective and user friendly heating controls can save up to 30% of the energy cost to heat a building. This is particularly the case when a building has upgraded the insulation, or is built with high levels of insulation. In Ireland, where the outside climate varies considerably, it is important for your heating system to be able to vary the output according to demand. Typical Irish homes have very little control of their heating; therefore the house will overheat in warm weather and underheat in cold weather.

The Benefits of Heating Controls

- Reduction in heating bills
- Increased comfort levels
- Reduction in greenhouse gas emissions

Do I Need Heating Controls?

You can do a quick check on your heating control requirements by answering the simple questions below. If you answer NO to all or the majority of the questions below, it would be beneficial for you to install some heating controls

- Can you heat your domestic hot water without switching on your radiators or an electric immersion heater?
- Can you turn on your heating without heating your domestic hot water?
- Can you easily adjust the heat output from radiators in the rooms you use most often?
- Have you temperature control on your boiler?
- Have you time control on your boiler that you can set for different days of the week?
- Have you a separate temperature control for your hot water cylinder?
- Have you a separate time control on your hot water cylinder?

Thermostatic Radiator Valves (TRV's)

A TRV is a thermostat that regulates the amount of heat going into a radiator according to the temperature in the room. You can set a specific temperature level for a room that you are comfortable with, and then as the room heats up to that comfortable temperature, heat flow is reduced into the radiator, stopping when it reaches your comfortable set level. TRV's are particularly useful in rooms where the temperature requirement is different to that required in the main living area bedrooms, or rooms where there are other heat sources such as in kitchens.

7-Day Programmable Timer

A 7-Day programmable timer will allow you to set your heating system to match your occupancy patterns on a daily and weekly basis. The separation of space heating and domestic hot water controls into zones will also allow you to set each zone to operate for required periods only. For example: you can set your boiler to switch on automatically before you wake in the morning to heat water for showers without turning on the central heating.

Boiler Interlock

Boiler interlock is a method of interconnecting your heating system controls with your boiler to ensure that the boiler only operates when required.

Time and Temperature Control of Electric Immersion Heater

Time and temperature controls installed on immersion heaters allow householders to pre-set the time period required for water heating and the temperature to which water is heated. This means that water need not be heated for longer than required or to higher temperatures than required. Temperatures for hot water should be set to a maximum of 60°C. To heat water above this temperature only to add cold water to it afterwards is a waste of your energy. Please note that if you have a solar water heating system in place, this temperature may need to be set higher.

4. Advanced Heating Controls:

These controls must have five zones as a minimum, but it is recommend installing zone controls in each room. This level of control will ensure that the heating in your house matches your lifestyle and therefore reduce the costs and increase the comfort of your home.

- Kitchen control to ensure that the kitchen is warm in the morning and early evening, but not excessively.
- Children's bedrooms heat up from 6-10pm and adults bedrooms from 9-11pm to reflect the differing requirements. Different temperatures are also included so that a young child or elderly person has a high temperature.
- Sitting rooms to heat only in the mid to late evening, and to a high temperature to reflect the requirements of the occupants. These controls will also react to other heat sources, such as stoves or open fires to prevent overheating.

Advanced Heating Controls are grant aided under the SERVE Energy Efficiency Additional Grant Measures. These advanced heating controls can save the homeowner significantly more money than the two zone system. See Section 3 of the Information Guide for more details.

5. High Efficiency Boilers:

Older conventional boilers can be wasteful of energy and costly to run because a significant portion of the heat is lost up the flue/chimney. The latest models of high efficiency boilers capture more of this heat, which would otherwise be lost.

Benefits

Replacing your boiler with a high efficiency boiler will:

- Reduce your heating bills
- Reduce Greenhouse Gas emissions
- Increase comfort levels in your home

How do I know if I need a new High Efficiency Boiler?

You can do a quick check on your boiler requirements by answering the questions below. If you answer YES to all or the majority of these questions it would be beneficial for you to further investigate installing a new high efficiency boiler

- Was my current boiler installed over 10 years ago?
- Has my heating bill been increasing in recent years?
- Is my current boiler too big for my needs? (Are there less people in my house now, do I need less heat and hot water?)

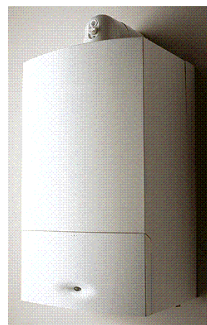
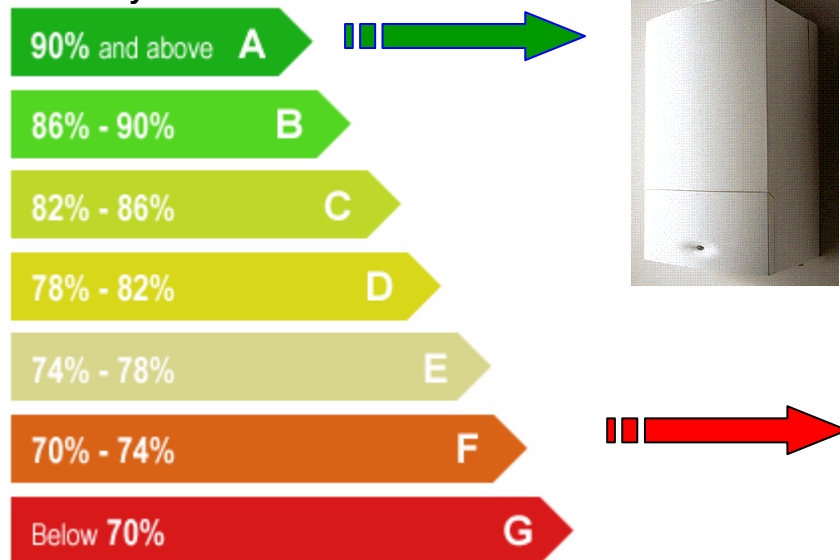
Boiler sizing

If you decide to install a new boiler, please be sure to ask your supplier about the boiler size (i.e. kW rating). An oversized boiler can be very wasteful of energy. If you have recently upgraded your insulation or glazing for example, a like for like replacement may not be the most suitable solution for you.

Home-heating Appliance Register of Performance (H.A.R.P.) Database

The HARP database is a product database for home-heating appliances that are used in Ireland. The database allows consumers to check the compliance of boilers against the Boiler Efficiency Directive and is also used as a resource in the boiler efficiency promotion campaign. Any boiler installed under the remit of the SERVE Energy Grant Scheme must be approved on the SEI HARP database or equivalent and have a seasonal efficiency of over 94%. The SEI HARP database is available online at www.sei.ie.

Efficiency band of HARP Database



It is vital that you ask the relevant installer to ensure that the quotation provided is for an installation which achieves an efficiency $\geq 94\%$.

6. High Efficiency Hot Water Cylinders:

Efficiency in hot water cylinders:

Up to very recently the majority of hot water cylinders used in houses were non-insulated copper cylinders which are inefficient at keeping hot water hot. More recently hot water cylinders that are installed have 25 - 50mm of factory fitted foam insulation applied to them to stop heat loss. Under the 2008 building regulations, cylinders must have at least 50mm of factory fitted insulation fitted to them. If you are considering installation of a solar hot water system then you should choose an appropriately large tank (300 Liters)



It is vital that you ask the relevant installer to ensure that the quotation provided is for an installation which achieves an insulation level of 50mm Polyurethane (PU) Factory fitted Foam.

7. Lighting:

7.1 Lighting Controls:

What are Lighting Controls?

Lighting controls automatically switch off or dim lighting in order to reduce energy waste caused by having lights on unnecessarily. This is a relatively new technology to be installed in Irish homes.

Benefits of Lighting Controls?

- Reduced energy costs due to lighting
- Elimination of having to turn on and off lights in rooms that you are only using for a few minutes at a time.
- Lower CO₂ emissions due to energy use.

Where are lighting controls usually installed?

Lighting controls can be installed anywhere. Typically they have been installed outside, often called sensor lights, to act as a security deterrent. More commonly in commercial buildings they are installed in bathrooms, corridors and meeting rooms. In the home there are several places that lighting controls could be installed:

- Bathrooms
- Corridors
- Utility Rooms
- Frequently used storage areas.

They would not be suitable for bedrooms or high occupancy areas like kitchens or living rooms.

What types of Controls are available?

Push button timers:

These are push to operate switches that switch the light off after the timer has elapsed. The delay time can be set to the users preference. These units are designed to replace an existing light switch. They are typically installed in corridors.

PIR Lighting Controls:

PIR stands for Passive Infra Red. A passive infrared (PIR) detector is commonly used in alarms. It monitors infrared levels in the sensors field of view. These are typically installed in bathrooms and utility rooms.



PIR indoor detector



Push button timer switch

7.2 LED Downlights:

What are LED's?:

LED stands for Light Emitting Diode. They contain a special silicon material that gives off light when an electrical current is passed across it. They do not generate as much heat and this is one reason why they are more efficient than regular incandescent bulbs.

Benefits of LED technology:

Many homes in Ireland have installed halogen downlighters in kitchens and living rooms. They result in a better distribution of light, but use significantly more light than traditional pendant based bulbs. The LED lights have the following benefits:

- Even distribution of light like the halogen bulbs
- Very low cost to run (typically 5 - 10% of halogen bulbs)
- Extremely xtremlly long life (typically 10 – 20 years)

What types of LEDs should I Use?

LEDs are available in a wide variety of outputs and fittings. GU5.3 (low voltage) or GU10 (mains voltage) are the two most common halogen fitting types. LEDs of input of greater than 3 watts will replace Halogens of 30 – 50 Watts. LEDs of 1.5 or 2 watts will typically not be bright enough to replace a halogen light.

Case Study:

A typical kitchen has 6 x 50Watt halogen lights. They operate on average 4 hours per day, or 1460 hours per year. (assuming a unit price of 15c + VAT)

Annual cost of 50W halogen lighting:

€75

Annual Cost of 4W LED lighting to same brightness:

€6

Savings by switching:

€69 per annum.



Regular Halogen GU10



Regular Halogen GU5.3



LED GU10 (up to 7W)



LED GU5.3 (up to 7W)

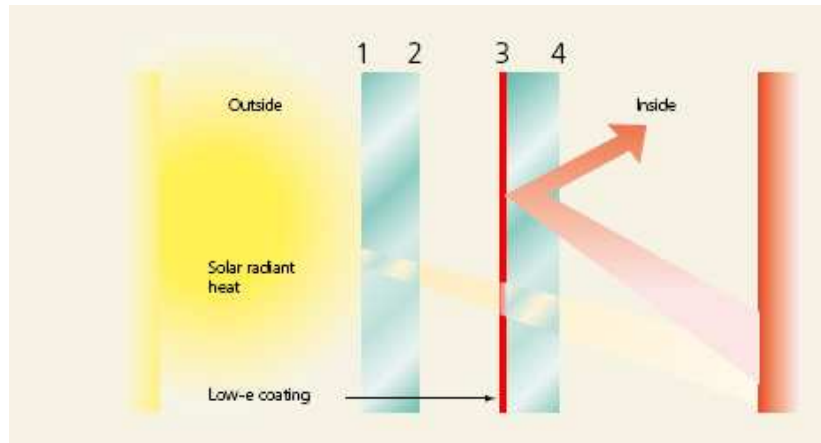
8. Windows ≤ 2.0 U-Value:

What is a U-value?

A U-value is a measure of the amount of heat which escapes through a material. In all aspects of building design one should try to achieve the lowest possible U-value, because the lower the u-value the less heat that is needlessly escaping. For example a single glazed window has a U-value of 5.7 while double glazed windows have an efficient U-value of 2.2 - 1.9 and 1.1 for triple glazing. It is only worthwhile replacing single glazed or very poor performance double glazed windows.

What is a Low Emissivity Coating?

A low emissivity (low-e) coating allows short wave radiation to pass through but stops the passage of long wave radiation. As a microscopically thin coating of metal or metal oxide on a pane of glass, it allows short wave solar radiation into the building. However, it effectively reflects long wave radiation from the interior back into the room. The lower the emissivity, the less radiation is emitted from the window to the outside environment – and the better the U-value.



The low-e coating on Surface 3 reflects heat back into the room reducing heat loss

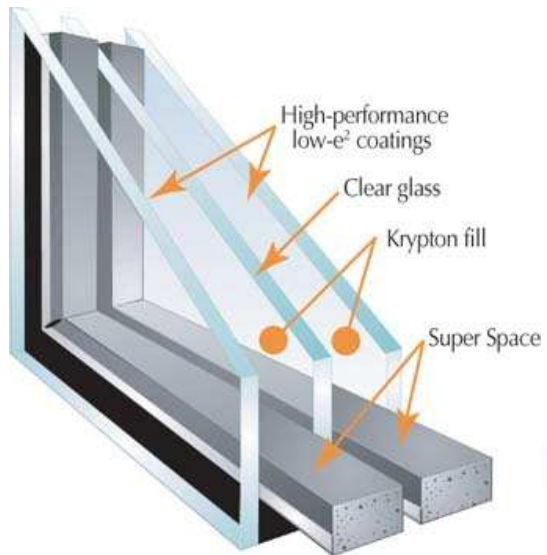
Gas-filled Windows

Heat is transferred between the panes of a sealed unit by radiation and by convection. Replacing the air in the cavity with a slow-moving gas reduces the overall heat loss.

Argon is most commonly used, although krypton and xenon are also used, especially where the cavity width is limited. These gases are inert and non-toxic and so do not pose any risk to health or the environment in the event of a breakage.

U-value Performance

To achieve a U-value of better than 2.0 a window must be at a minimum double glazed. However, double glazed windows filled with air would likely not reach the required standard. To achieve a U-value of 2.0 double glazed units would need to be argon filled **and** low emissivity coated with a minimum air gap of 12 millimetres thickness between the panes.



Triple glazed window profile



Double glazed window profile

It is vital that you ask the relevant installer to ensure that the quotation provided is for an installation which achieves a U-Value of 2.0 W/m^2

9. Solar Water Heating:

Key Solar Facts and Tips

Solar Panels, also known as solar collectors are devices usually located on the roofs of dwellings but can also be installed at ground level, provided it is not shaded. They use the sun's heat to warm water, or another fluid, which is pumped through the panel. The fluid is then fed to a heat store (e.g. a hot water tank) and provides hot water or a source of hot water for central heating for your home. Solar panels work throughout daylight hours, even if the sky is overcast and there is no direct sunshine. Solar panels can also be used to contribute to space heating demand. The cost of a professionally installed solar system for heating hot water can vary greatly. If you are considering investing in this technology you should research the products to ensure that you are getting the best system for your needs and value for money.

The Benefits of solar water heating

- Reduction in heating bills
- Increased comfort levels
- Reduction in Greenhouse Gas emissions

9.1 Flat plate Solar Collector

A flat plate collector consists of a thin plate called an absorber backed by a grid or coil of fluid tubing and placed in an insulated casing with a glass or transparent plastic cover

The fluid is circulated, using either mains or solar electricity, through the tubing to remove the heat from the absorber and to transport it to an insulated water tank, sometimes directly or otherwise to a heat exchanger or to some other device for using the heated fluid.

Most flat plate collectors have a life expectancy of 20 - 25 years.



9.2 Evacuated Tube Solar Collector

Evacuated tube collectors are made of a series of modular tubes mounted in parallel. This type of

collector consists of rows of parallel transparent glass tubes, each of which contains an absorber tube (in place of the absorber plate to which metal tubes are attached in a flat-plate collector). In some cases, the tubes are covered with a special light-modulating coating. In an evacuated tube collector, sunlight passing through an outer glass tube heats the absorber tube contained within it. The absorber can either consist of copper (glass-metal) or specially-coated glass tubing (glass-glass). The glass-metal evacuated tubes are typically sealed at the manifold end, and the absorber is actually sealed in the vacuum, thus the fact that the absorber and heat pipe are dissimilar metals creates no corrosion problems. Foam insulation is used in the manifold.



Location

The optimum location for solar panel collectors for all year round energy collection is roughly south facing and at a tilt angle of 30°- 45° to the horizontal (however angles between 15° and 60° are also acceptable). It is also important that the collectors are positioned so there are no shadows on them during the middle of the day. Shading can be from the collectors themselves, or from trees, chimneys, part of the building or adjacent buildings.

Controller

After commissioning, a permanent power supply should be provided for the solar controller to ensure circulation in the system.

Water Storage Cylinder

An appropriately sized cylinder should be chosen for the house. The volume of your solar hot water cylinder is related to the solar panel area and the maximum cylinder temperature. It is recommended that the hot water tank has 50 - 80 litres of water per square metre of solar panel area, and it is supplied and at a maximum cylinder temperature of 80 – 90 °C. Smaller capacities will limit the benefit from the system and may lead to frequent overheating of the solar circuit. Generally Dual Coil Cylinders should be used, having the coils at the top and bottom of the cylinder. The solar collector circuit should be connected to the bottom coil and the auxiliary circuit to the top coil, which will enable the solar system to pre-heat in cold weather. Your installer will be able to help you choose an appropriately sized cylinder for your system.

Thermostatic Anti-Scald Valve

Best practice calls for the fitting of a thermal mixing (anti-scald) valve. This applies to all hot water systems and not just solar heated water systems. With the current recommendation to store hot water at 60°C to prevent the growth of Legionella bacteria it is becoming more of a consideration to install thermal mixing valves. A thermal mixing valve mixes cold and hot water together to ensure the water temperature is safe for people to use.

System Components

- A solar collector which absorbs sunlight and changes it into heat
- A pump which transfers the heat from the collector to hot water in the storage cylinder
- The storage tank accumulates the hot water produced by solar energy so that it can be stored for use when needed
- A back-up heater (gas, oil, or wood fueled boiler, immersion heater or heat pump) which will bring the hot water to the temperature required when there is not enough sunlight to do so.

In Ireland, solar collectors alone cannot provide all the hot water for a household's needs throughout the year. Correctly sized they will supply 60% of heat or domestic hot water needs. They are normally installed in conjunction with a conventional back-up heating system.

10. Wood Stoves / Inserts

A wood stove is a space heater i.e. intended to heat a space directly, unlike a central heating boiler which supplies its heat to the house through a system of pipe work. A wood stove is an economical wood heating option. A stove can be located anywhere there is enough space and where its flue can be properly routed. A perfect installation has the stove located centrally in the main sitting room/ living area of the house and the flue pipe running straight up into the chimney. This installation design will provide the best performance and will require the least amount of maintenance.



Stove inserts are also available on the market which fit directly into an existing fireplace or hearth. These stoves, pictured left, operate by convection of air around the firebox and can be some of the most efficient stoves on the market. Some of these stoves are designed to fit existing fireplaces, so there is often very little work required to fit into the fire place. Only log burning stove inserts are grant aided under the SERVE Energy Grant Schemes.

Benefits

Replacing your boiler with a log stove will:

- Ensure your main living area is more comfortable by eliminating unwanted air flow up the chimney, even when the stove is not in use.
- Use less fuel to heat your living area (much higher efficiency).
- Allow you to use locally sourced sustainable wood fuel, promoting local jobs.
- Reduce your heating bills
- Reduce Greenhouse Gas emissions (your carbon footprint)

Quality Stoves

There are many stoves on market that conform to various quality standards. A good quality stove will conform to the **European Standard EN13240/13229**. Stoves that do not meet this standard are not eligible under the scheme. Stoves must also reach a rated efficiency of 65%. Most high quality brands will exceed this standard. **Care must be taken to ensure your stove meets the above standard.**

Air Supply

A stove must have a secure air supply for safe operation (see Part J of the current Building Regulations – go to www.environ.ie). This can be either in the form of a controlled dedicated air supply directly to the appliance, or in the form of a permanent ventilation opening to the room in which the appliance is located. Best practice is to rely upon dedicated ventilation and not on air infiltration or leakage into the room. The size of the opening depends on the size of the appliance. Your installer should be able to size this correctly. In addition, extractor fans may interfere with the operation of the appliance causing smoke to escape out of the appliance into the surrounding area so please consult with your installer.

Flues

The flue is used for the exhaust of the stove. It can be installed through a chimney or outside the building. Care must be taken with a wood burning stove that there is sufficient draw through the chimney to allow for safe and efficient use of the appliance. A registered installer will survey the

installation before purchase to ensure suitability, and recommend any required works to ensure safe installation. The flue must be installed to current Building Regulations. (Part J, check www.environ.ie). If installed outside the building some things to look for would be:

- It is above the eaves line by 1metre or 600mm if coming out near the roof apex.
- It is double walled and insulated.
- It has a cowl on top to prevent downdraughts.
- It should be separated from any possible combustible material.

11. Wood Heating Systems

11.1 Wood Pellet Boilers:

Key Facts & Tips

Modern wood pellet boilers offer the warmth and comfort of wood heating while being highly efficient, clean burning and totally automatic, saving you time and money. Pellet boilers are automatically lit and continue to operate without manual intervention. Automatic fuel supply and thermostat means you can relax and enjoy the comfort of pellet heating at the switch of a button. Automatic ignition means that lighting the boiler is convenient and easy. Most modern pellet boilers are self cleaning so daily cleaning is avoided. The ash pan needs to be emptied bi-weekly, or less frequently, depending on models.

Benefits

Replacing your boiler with a wood pellet boiler will:

- Reduce your heating bills
- Reduce Greenhouse Gas emissions
- Increase comfort levels in your home

How do I know if I need a new Boiler?

You can do a quick check on your boiler requirements by answering the questions below. If you answer YES to all or the majority of these questions it would be beneficial for you to further investigate installing a new high efficiency boiler

- Was my current boiler installed over 10 years ago?
- Has my heating bill been increasing in recent years?
- Is my current boiler too big for my needs? (Are there less people in my house now, do I need less heat and hot water?)

Bulk Fuel Storage:

Biomass boiler installations require the provision of bulk storage. It shall be required to meet local building and fire regulations. The ONORM M7137 Standard (<http://onnorm.at/ecom/>) shall be used as a guideline for DIY bulk storage units. Bulk storage capacity shall be able to store a minimum of 3 tonnes of wood pellets (80% of a typical house's requirement for one year).

Buffer Heat Store

It is a recommendation that a buffer or accumulator tank be installed as part of domestic wood pellet boiler system installations where appropriate. A buffer or accumulator cylinder in a domestic wood pellet heating installation is a primary heat storage/distribution cylinder, which is heated by the boiler to a set temperature and can store the resulting hot water for long periods while the system is idle, until heating or hot water is required. A buffer reduces the on/off cycling of wood boilers by "smoothing" the heat output to the dwelling. The buffer capacity should be calculated in accordance with your manufacturer's recommendations. A rough guideline for establishing the volume of the buffer is available from EN303-5 and from the REIA training manual and is in the region of 55 to 65 Litres / kW of the rated boiler size.



The use of a buffer should be considered in the following situations:

- Where the boiler does not have full modulation capabilities, the use of a buffer will smooth the heat output to the dwelling.
- In situations where the boiler is not capable of supplying the full heat demand of the house, a buffer tank will allow the boiler to run for longer at optimum efficiency extracting maximum potential from the boiler and fuel.

Air Supply

A boiler must have a secure air supply for safe operation (see Part J of the current Building Regulations – go to www.environ.ie). This can be either in the form of a controlled dedicated air supply directly to the appliance, or in the form of a permanent ventilation opening to the room in which the appliance is located. Best practice is to rely upon dedicated ventilation and not on air infiltration or leakage into the room. The size of the opening depends on the size of the appliance. Your installer should be able to size this correctly. In addition, extractor fans may interfere with the operation of the appliance causing smoke to escape out of the appliance into the surrounding area so please consult with your installer.

Flues

The flue is used for the exhaust of the boiler. It can be installed through a chimney or outside the building. The flue must be installed to current Building Regulations. (Part J, check www.environ.ie). Some things to look for would be:

- It is above the eaves line by 1metre or 600mm if coming out near the roof apex.
- It is double walled and insulated.
- It has a cowl on top to prevent downdraughts.
- It is separated from any combustible material.

Boiler sizing

If you decide to install a wood pellet boiler, please be sure to ask your supplier about the boiler size (i.e. kW rating). An oversized boiler can be very wasteful of energy. If you have recently upgraded your insulation or glazing for example, a like for like replacement may not be the most suitable solution for you.

It is vital that you ask the relevant installer to ensure that the quotation provided is for an installation which achieves an efficiency $\geq 85\%$ as required under the SERVE Energy Grant Scheme.

11.2 Wood Gasification Boilers:

Key Facts & Tips

A wood gasification boiler is a central heating boiler which produces its useful heat through combustion of wood gas (from wood logs). This is done by burning the wood in two stages, firstly producing the wood gas by burning the timber without enough air, then the second stage is taking the wood gas and burning in a second chamber. This is not unlike a wood stove that attempts to burn the wood gas at the top of the stove, rather than at the wood itself.

Wood gasification boilers offer the warmth and comfort of wood heating while being automatic, highly efficient and clean burning, saving you time and money. Owning a wood boiler is a commitment to preparing the fuel for combustion, drying it up to 2 years, and cutting it to the correct size. These are commonly installed in houses where there is a large amount of timber available locally, either on a farm, or with sufficient space to dry the timber. Why go to the bother of the extra work? This is generally recognised as the cheapest way to heat a house or building.



Benefits

Replacing your boiler with a wood gasification boiler will:

- Allow you to use locally sourced \ your own timber
- Reduce your heating bills
- Reduce Greenhouse Gas emissions
- Increase comfort levels in your home.

Buffer Heat Store

A buffer store must be installed in conjunction with your wood gasification boiler to ensure the efficient operation of your boiler. Buffer stores are important heat storage devices, especially for wood gasification boilers. These boilers can only be operated efficiently when combined with a buffer since controlled operation at part load is more difficult to achieve. This is due to the nature of the fuel (generally wood logs). Once combustion takes place, the fuel will continue to burn irrespective of whether the dwellings heat load is met. Consequently the buffer cylinder in a domestic biomass heating installation is the primary heat storage / distribution device, which is heated by the boiler to a set temperature and can store the resulting hot water for long idle periods, until heating or hot water is required. The buffer or accumulator capacity should be calculated in accordance with your manufacturer's recommendations. A rough guideline for establishing the volume of the buffer is available from EN303-5 and from the REIA training manual and is in the region of 55 to 65 L/kW of the rated boiler size.

Air Supply

A boiler must have a secure air supply for safe operation (see Part J of the current Building Regulations – go to www.environ.ie). This can be either in the form of a controlled dedicated air supply directly to the appliance, or in the form of a permanent ventilation opening to the room in which the appliance is located. Best practice is to rely upon dedicated ventilation and not on air infiltration or leakage into the room. The size of the opening depends on the size of the appliance. Your installer should be able to size this correctly. In addition, extractor fans may interfere with the operation of the appliance causing smoke to escape out of the appliance into the surrounding area so please consult with your installer.

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- It is above the eaves line by 1metre or 600mm if coming out near the roof apex.
- It is double walled and insulated.
- It has a cowl on top to prevent downdraughts.
- It is separated from any possibly combustible material.

Boiler sizing

If you decide to install a wood gasification boiler, please be sure to ask your supplier about the boiler size (i.e. kW rating). Sizing of Gasification boilers is completed quite differently to standard boilers and a supplier will be able to help you detail what the best size for your house is. An oversized boiler can be very wasteful of energy. If you have recently upgraded your insulation or glazing for example, a like for like replacement may not be the most suitable solution for you.

It is vital that you ask the relevant installer to ensure that the quotation provided is for an installation which achieves an efficiency $\geq 85\%$ as required under the SERVE Energy Grant Scheme.