10/6/16

Construction folder

2016

Indirect water system in a bungalow (Cold Water Systems)

Exam no. : 154244

Contents

Introduction

What my project is:

- I will my project to the scale of 1.10 scale as it is not too small or too big of a scale and it shows everything in a good proportion

- My project is the water system in a domestic bungalow

- The most common cold water system used in a domestic house is indirect cold water system.

- In my project I will show the water coming from the mains into the house and the route the water takes to get to the tank and to get around the house to all the appliances.

I choose this project to develop an understanding of the water system:

- I have always been curious on how water comes in and gets around all the appliances in the house and can be supplied whenever needed

- I have only fully understood the whole ins and outs of the water system after going through the chapter and looking online to see all the different types and the benefits of each

- Since 1997 water supply to houses was not billed except if you are in a group scheme (who have always had to pay for their water) ,this has now changed as it came in the 2010 budget that there would be a tax on water by using water meters has come in this year

My aims when doing this project:

- I want to show a realistic view of the route the water will take to get to all the appliances in the house.
- I also want to show how the water is heated in the house
- I want to develop an understanding of the water systems in a house and give others and understanding of the (indirect) water system in the house.

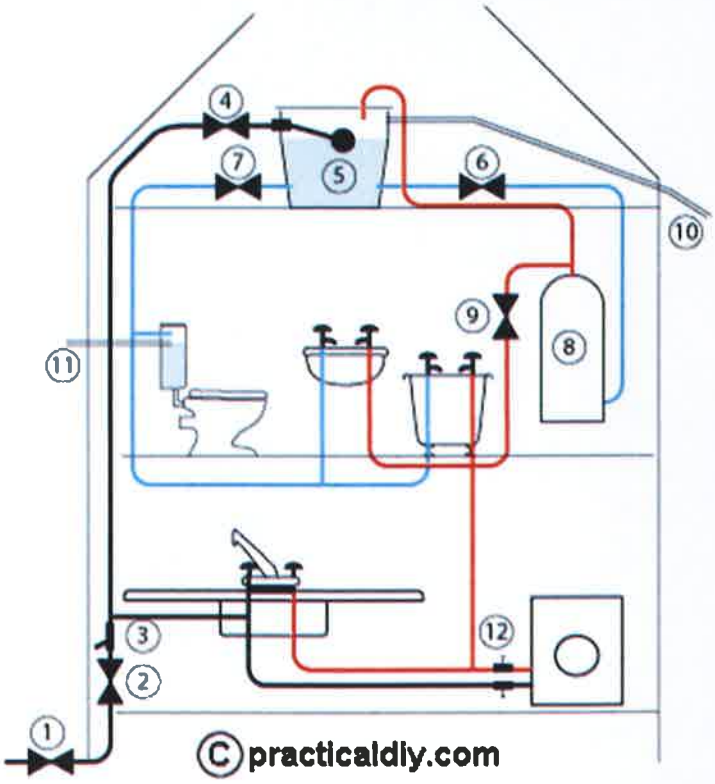
Internet Research

Internet research

Indirect water supply

An indirect water supply system is the most common type found in modern houses.

The mains water comes in via a rising main and directly feeds at least one cold tap at the kitchen sink with 'potable' water (i.e. water which is fit for drinking, cooking etc.) and may also feed a washing machine, a shower and an outside tap etc. The rising main also feeds a storage tank at a high point in the building from where the water is fed to all the other taps etc. using gravity.



The items identified in the illustration above (NOTE that the central heating has been omitted for clarity) of an indirect water supply are:

1. Water company stopcock - this can cut off all the water to the premises and is the point where the responsibility for the water pipe changes; up to,

and including, this stopcock is the responsibility of the water supply company (even if the stopcock is on your land); from here to the house, is the house owner's responsibility.
Make sure you know where this stopcock is located and, periodically, check that it's working - if you have a disaster in the house, you may want to turn the water off at this stopcock quickly.

2. Householder's stopcock - this normally can cut off all the water within the house but the householder is responsible for it. It's usually located where the rising mains enters the house, often under the kitchen sink.
3. Draincock - this allows the rising main within the house to be drained down at the lowest point.
4. Stopcock - this stopcock can be used to isolate the rising main from the storage tank to allow maintenance without having to cut off all the water from the property.
5. Storage tank with a ballcock float valve to control the water stored. The tank will typically hold from 230 to 360 litres (50 to 80 gallons) of water at the highest part of the building - the higher it is, the better the gravity feed pressure at the taps etc.
From 1991, the tank should be fitted with a close fitting lid; the expansion pipe from the hot water tank should pass through a grommet in the lid to keep out contaminations.
6. Gate valve which can isolate the cold water feed to the hot water tank.
7. Gate valve which can isolate the cold water to the WC and taps etc.
8. Hot water cylinder.
9. Gate valve which can isolate the hot water to the taps.
NOTE: Without the valves 6, 7 and 9, any maintenance on the taps or hot water cylinder etc. would require the storage tanks to be drained down - by using the appropriate valve to isolate the part being worked on, the amount of water wasted is minimised.
10. Storage tank overflow pipe - this takes any overflow of water from the storage tank out of harm's way and deposits it outside of the building. It needs to be positioned so that any water flow is immediately noticed as it would indicate a problem.
Since 1991, the entry to the overflow inside the tank should include a filter to prevent even a small insect from entering the tank.
11. WC overflow pipe - this takes any overflow from the WC cistern out of harm's way and deposits it outside of the building. It needs to be positioned so that any water flow is immediately noticed as it would indicate a problem.
12. Inline valves to isolate water feeds to washing machine or dishwasher etc.

Stopcock or gate valve?

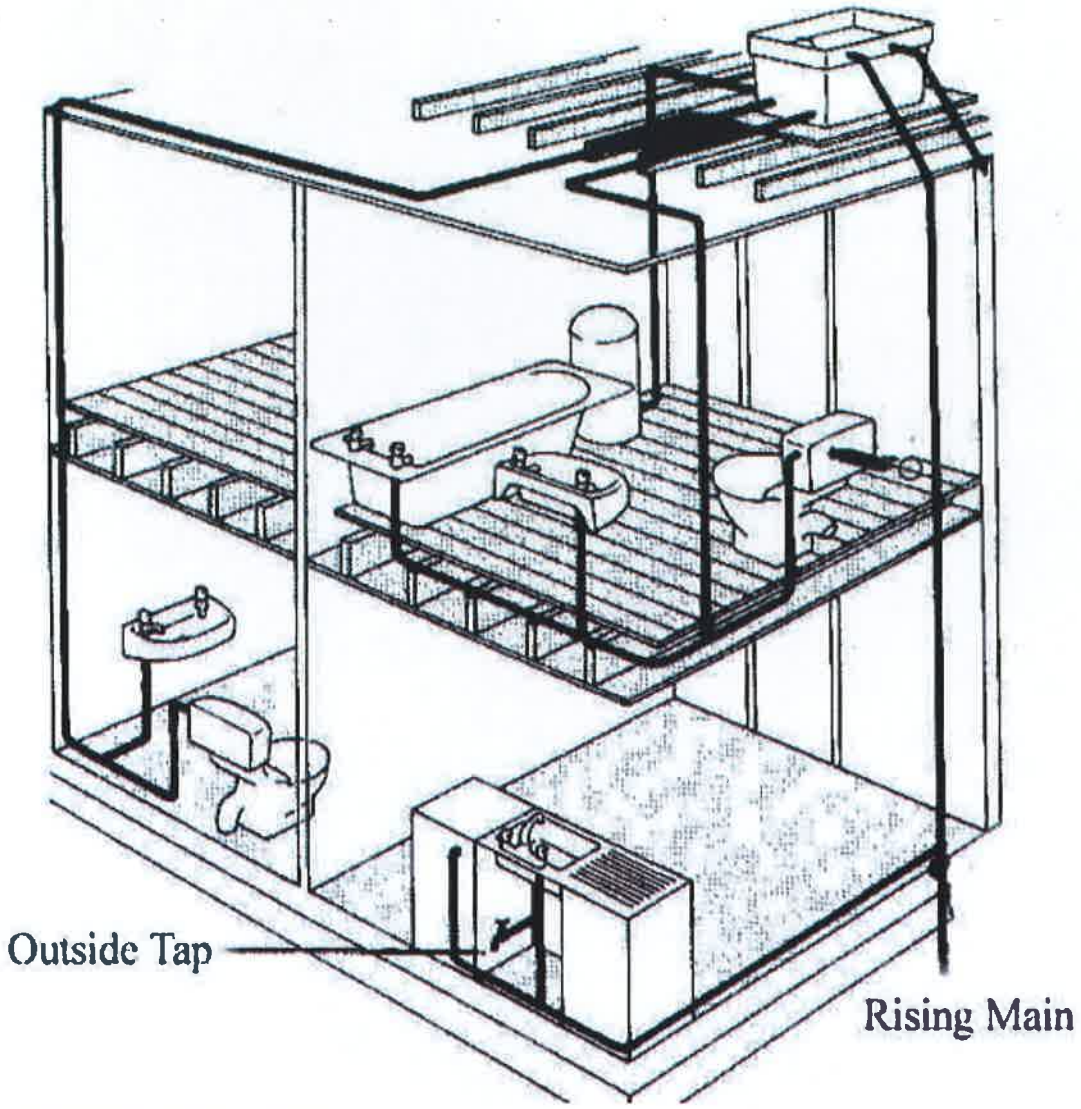
A stopcock works like a tap in that when it is closed, a washer is pushed over an opening to stop the water flow whereas when a gate valve is operated a 'shutter' is wound across the opening. With a stopcock, some water pressure is usually required to lift the washer clear of its seat when it is opened to allow the water to flow; with a gate valve no pressure is required.

This basically is why stopcocks are used on the raising main (where the water pressure can be substantial) and gate valves are used on the water feeds from the gravity fed water storage tank (where the water pressure is a lot less and could be insufficient to lift the washer in a stopcock).

http://www.practicaldiy.com/plumbing/water-supply/indirect-water-supply.php

Cold Water Systems Including Indirect and Direct Systems Found in Your Home

Summary: This DIY guide looks at the various cold water systems found within a home that include direct cold water systems and indirect cold water systems and how each of these systems works to supply water to a variety of appliances.



Domestic water system

Indirect Cold Water System

In the indirect cold water system, water comes into house via rising main. It is then branched off to feed at least one tap (in the image above, this is the kitchen and outside tap and the boiler next to the sink) and then continues to a storage tank in the loft. From here it is distributed to the other taps in the house. Overflow pipes are marked O. The position of stopcocks etc. is marked on the diagram below which also shows the hot water path.

CONSUMER ADVICE GUIDE

UNDERSTANDING HOT WATER SYSTEMS IN THE HOME

This advice guide is part of a series of free guides produced by the Association of Plumbing & Heating Contractors Ltd. which provide consumers with essential basic information on a range of plumbing and heating matters including installations, repairs and maintenance.

There are lots of ways to heat the water in your home. To help you understand hot water systems we have broken them down into the three main types of systems and then further broken down these into their main components so you can compare and understand which part does what.

What are the main types of hot water systems?

Currently there are three main types of hot water systems in use in the UK; open vented, unvented and instantaneous. But what do these terms mean and how do they work?

1. Open vented hot water systems

This system uses many different parts to heat the water. It consists of a hot water cylinder, a cold water storage cistern (tank), special pipework (known as an open vent pipe), and a heat source to heat the water. There are two types of open vented hot water; direct heating and indirect heating.

- **Direct heating** – the water is heated directly from the heat source either by an immersion heater or by the boiler.
- **Indirect heating** – the central heating and the hot water are separate. The water is heated via a coil (heat exchanger) from a boiler. This is done because there is a set of radiators connected to the boiler, in this case water in the central heating system slowly becomes contaminated by iron residues from the radiators which would make the hot water unusable for washing.

The cylinder - is the main part of the open vented hot water system; this is where the hot water is heated. The heat can come from an immersion heater, directly from a boiler or indirectly from a boiler using a coil fitted inside the cylinder. Often the indirectly heated cylinders come with an immersion heater back up in case of a boiler breakdown.

The cylinder coil (heat exchanger) - is the tube that is often fitted to a cylinder to heat up water using the water from the central heating system. The pipe itself is coiled up inside the cylinder to give as much chance as possible for the pipe to 'touch' the water in the cylinder and heat it up.

The storage cistern - is the reservoir of cold water used to supply the cylinder. This is always positioned above the cylinder to give a head of pressure (to make the water flow out of the cylinder).

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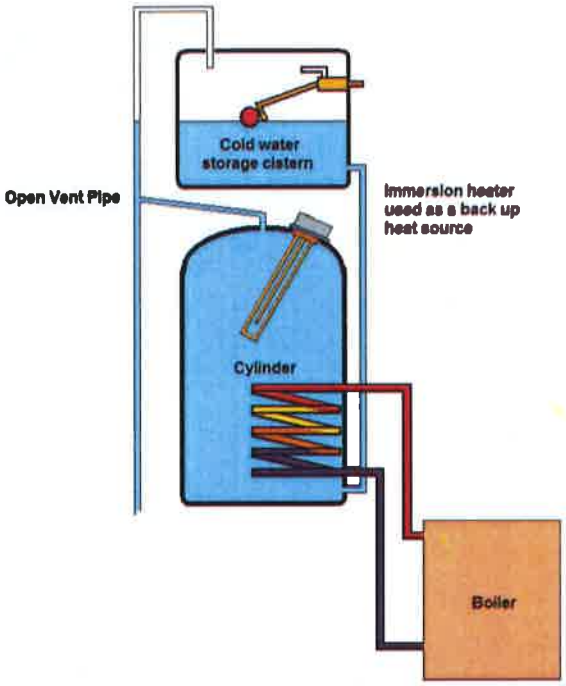
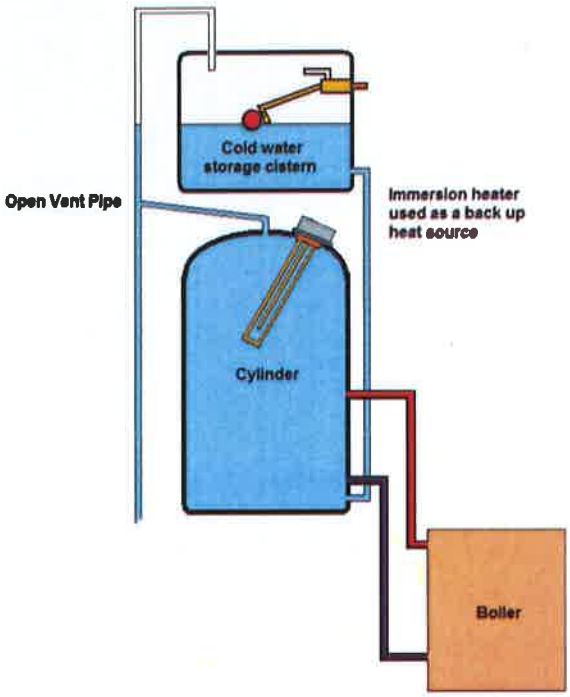
The open vent pipe - is the main safety setup for an open vented hot water system. It helps the system cope with the expansion of water in the system. The open vent pipe should end in the storage cistern allowing for the control of expansion of the hot water in the system.

How does it all work together?

The two diagrams below show the general layout of open vented hot water systems:





Unvented hot water systems

These systems are far more complicated, and have many more parts to them but do allow near mains pressure hot water supply. They are designed to do away with the storage cistern and operate at a much higher pressure than the open vented system.

Pressure reducing valve -This is placed on the incoming cold water main pipe to the hot water system to reduce the water pressure slightly and keep it at a constant level of pressure.

Line strainer - This is placed on the incoming cold water main pipe to filter out any particles that might come from the cold water system, because of the sensitive nature of some of the components (a small piece of grit could cause them to malfunction), the strainer keeps them clear.

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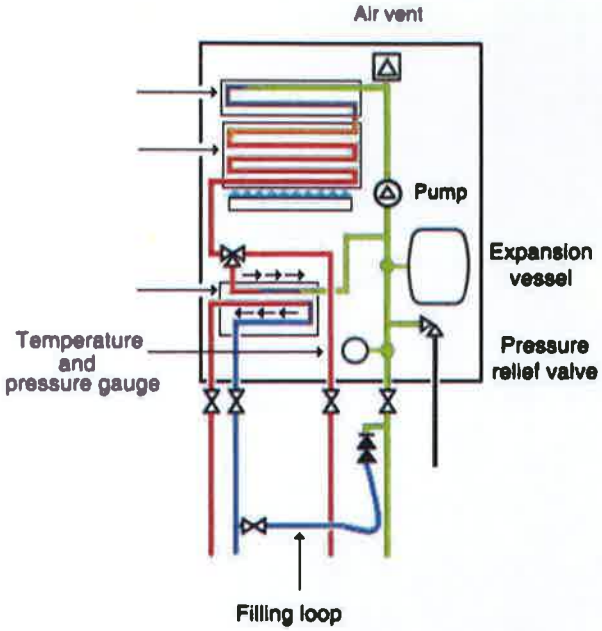
exchanger (heat swapping). This part swaps out the heat from the heating water to the hot water parts of your home.

The boiler diagram below works by heating the central heating water and pumping it around to the diverter valve. This is then diverted from the central heating circuit to go into the water to the heat exchanger where it passes the heat from the central heating water to the cold water coming into the boiler.



Common materials and components

The following are materials and components, common to all hot water systems.

Copper and plastic pipes

Pipes for hot systems can be either copper or plastic, and come in many sizes from 8mm to 35mm in diameter.

Programmer / timer - This decides to turn the heating boiler on or off, and controls the flow of heated water to the hot water cylinder or radiators.

Cylinder thermostat - This little box sits on the hot water cylinder about 1/3 from the top. It measures when the water in the cylinder is warm enough (depending on what you set it to). As the cylinder cools down it will tell the programmer to turn it back on again.

Immersion heater – This heater uses electricity to heat the water; this is the same as an electric kettle but on a much larger scale. Where as a kettle is 300 - 500 watts, an immersion heater is 3000 – 5000 Watts.

Do you store or not store?

There are two ways of providing hot water to the home: A) one using a hot water cylinder to give a store of hot water. B) using a combination boiler or multipoint water heater to give instant hot water.

Before deciding which system is right for you, your plumber needs to know how much water will be used at any one time and for how long.

Stored hot water	Instantaneous hot water
Advantages	
Can deal with high demand more easily	Can be cheaper to run as water is heated only when used
Water can be heated by green sources of energy like solar or biomass	Hot water is produced very fast from cold
Allows the connection of different types of water heating methods	Can be cheaper to install than a storage system
Emergency backup heat source can be fitted to allow hot water if boiler fails	No chance of water growing harmful bacteria
Disadvantages	
Can be more expensive to run as water is heated even when not used	Cannot deal easily with high demand
Can take much longer to get hot water from cold	Can be very hard to connect alternate sources of hot water heating methods
Can be more expensive to install	Water can only be heated by non green sources: gas, oil or electricity
Greater chance of the water growing harmful bacteria	If the boiler fails there is no emergency backup heat source

In summary

Hot water systems provide hot water around the home and are relative straightforward, with the majority of new homes having an unvented hot water system or direct hot water system fed from a combination boiler.

CONSUMER ADVICE GUIDE

UNDERSTANDING COLD WATER SYSTEMS IN THE HOME

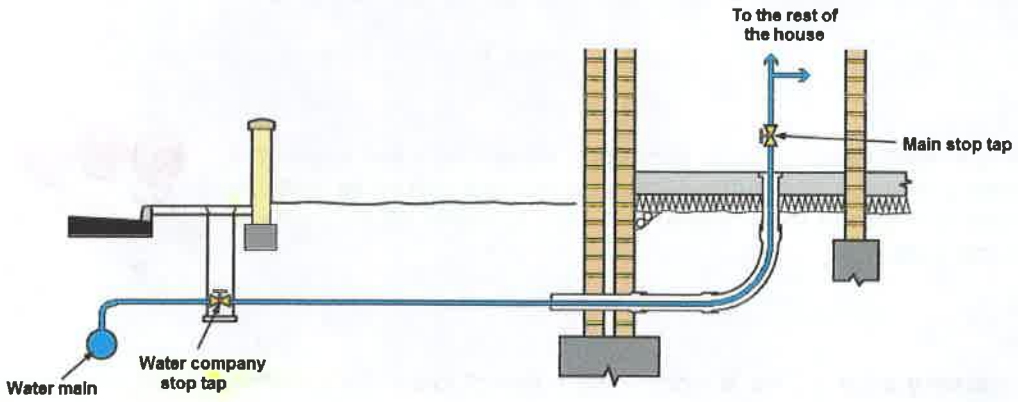
This advice guide is part of a series of free guides produced by the Association of Plumbing & Heating Contractors Ltd. which provide consumers with essential basic information on a range of plumbing and heating matters including installations, repairs and maintenance.

We don't often see the pipework that carries cold water around the home, for example, a cold tap on a bath, a cold feed to an electric shower or washing machine or an outside tap for using a garden hose. Understanding how cold water is distributed around the home will allow you to identify what has gone wrong in the unfortunate event of a leak or ensure you have the most suitable system installed to meet your needs.

Getting cold water to the home

A water supplier will provide water to a home, through a water main, then branch off. At this point, older systems may have one branch that connects up to four homes. New properties will have an installation similar to that shown in the diagram below.

It is vital that people living in a property know where and how to turn off the water supply to their home, in the event of a leak or for maintenance.



Cold water system components

The following materials and components are common to most domestic cold water systems.

Copper and plastic pipes

Pipes for cold water systems can be produced in either copper or plastic, and come in many sizes from 8mm to 35mm in diameter. The most common sizes for cold water pipes are 15mm and 22mm.

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Lead pipes

Very old cold water systems used lead pipes to run water around homes; this is still in place in a lot of properties in the UK. Lead pipes are also very commonly used between the water company stop tap and the mains stop tap in your home. It is now illegal to fit or alter lead pipe, it must be replaced with a copper or plastic pipe when changes to water pipes are required.

Cold feed

This is a pipe which provides cold water into a hot water or heating system.

Water main

This is a pipe that brings cold water directly from the water pipe in the street to the stop tap in your house

Stop tap

This can also be called a stopcock or stop valve. This is the tap which turns off the cold water into your house, from the water coming in from the street.

The Storage Cistern

This is the reservoir of cold water used to supply either the hot water cylinder or the central heating system. Inside the cistern there are components:

Ball cock

Float operated valve - This is commonly known as a ball valve. It is a mechanical valve that automatically opens and closes as water is removed and added to a cistern, and they come in all shapes and sizes and materials.

The warning pipe - This is commonly referred to as the overflow. It will advise the occupier that a cistern is full and the valve is not turning off water and 'warning' that it could spill over the cistern sides.

Book Research

Fig. 19.14 Various types of pipe fittings.

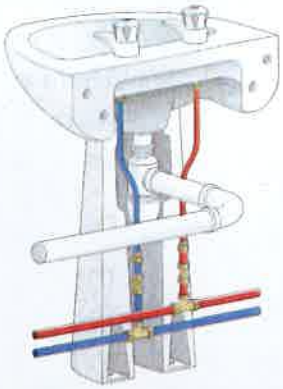


Fig. 19.15 Pipe fittings used to connect a sink to the water supply of the home.

Fittings. Fittings connect the different parts of the pipework. They are available in many shapes and sizes, and made from many different materials, including plastic, copper and cast iron. They are used to split the connections, change direction and/or extend pipework. Figs 19.14 and 19.15 show common fittings and how they are used to manipulate pipework.

DISTRIBUTION OF WATER

Water enters the house through the mains pipe, as shown in Fig. 19.16. The mains connection is located in a chamber under the pavement outside the dwelling. From here, the water goes straight to the kitchen sink. Stop valves are situated at the connection to the mains pipe outside the property and under the sink. Drain valves are fitted above the stop valves in order to drain water from the system if necessary.

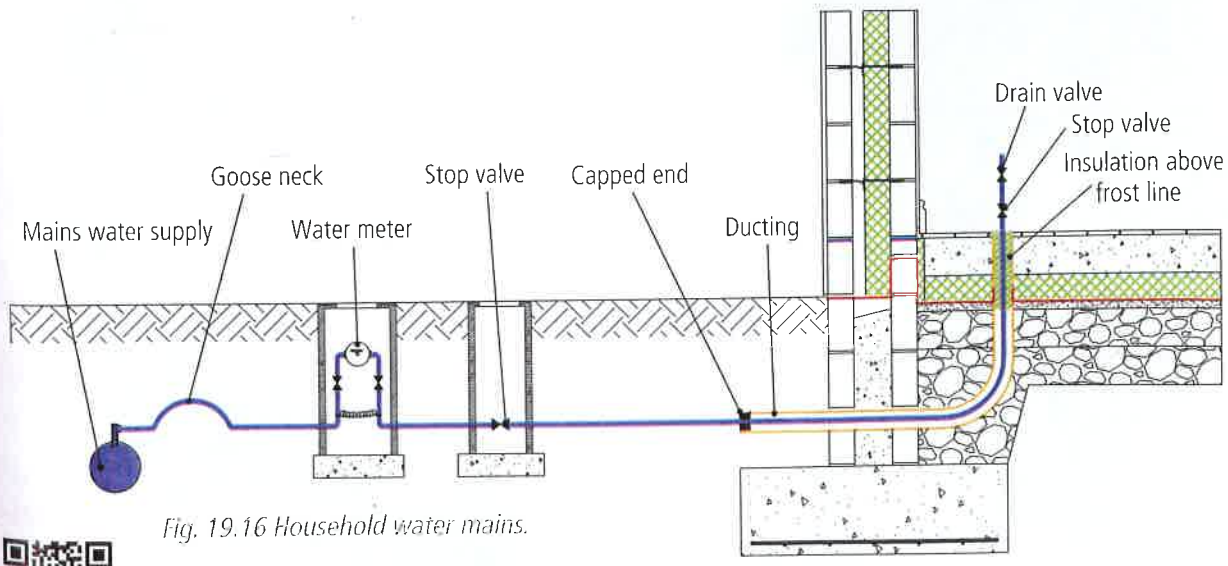


Fig. 19.16 Household water mains.

COLD WATER

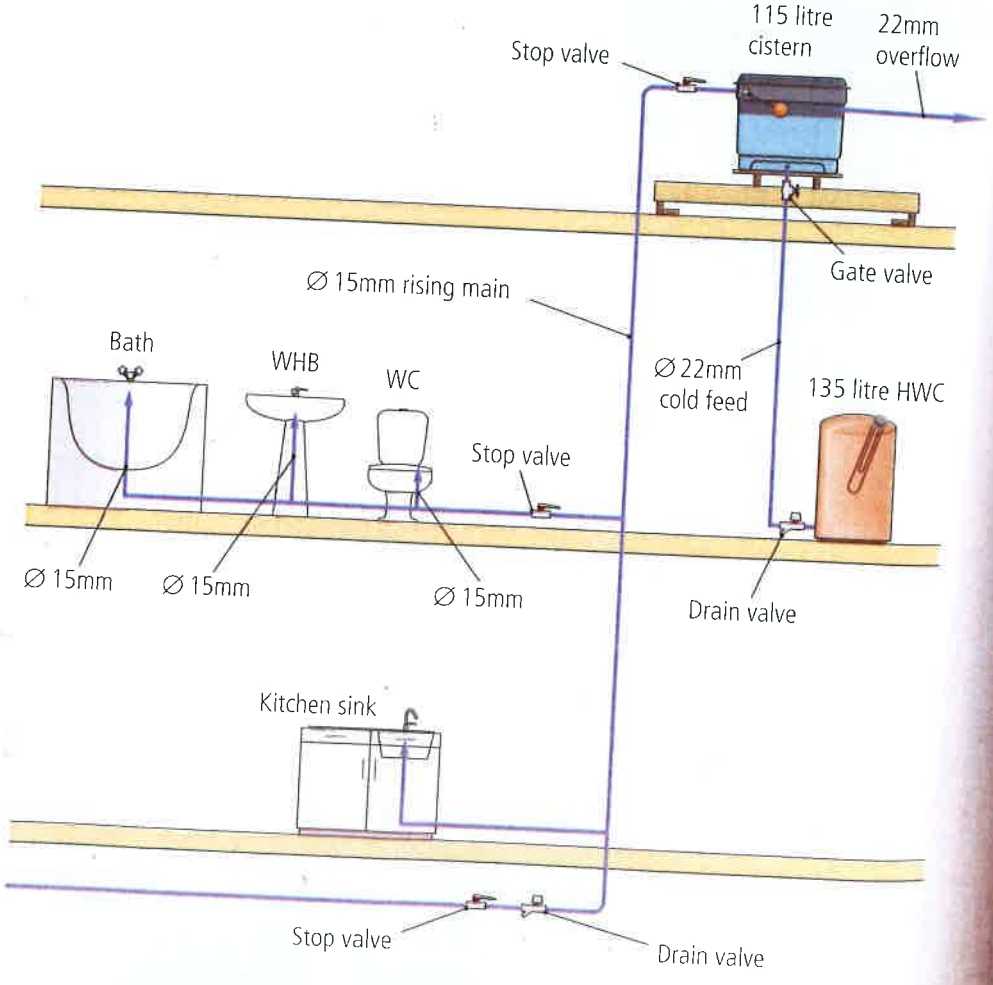
There are two systems for supplying a dwelling with cold water: the direct cold water supply system and the indirect cold water supply system. Each has its advantages and disadvantages.

Direct Cold Water Supply System

The direct system uses the mains feed to supply all the appliances in the house. This means that all sinks, showers, toilets and washing machines draw water from the same source. The water in the taps is suitable for drinking (drinking water is also called potable water). A non-return check valve must be used at taps in this system to prevent the drinking water being contaminated as a result of back flow. Fig. 19.17 illustrates the direct cold water system.

The advantages of the direct cold water system include:

- Ease of installation
- Low cost
- No large water storage cistern needed in attic
- Drinking water available from all taps
- Less pipework (which is susceptible to freezing) in attic.



The disadvantages of the direct cold water system include:

- Reduced pressure at peak times
- High failure rate of fittings due to increased pressure
- No reserve supply if mains fail.

Indirect Cold Water Supply System

The indirect cold water supply system directs the mains water coming into the house in two directions, one up to a storage tank or the cistern in the attic and the other to the kitchen tap. It is fed off to individual appliances from the cistern. The only outlet coming directly from the mains is the kitchen tap. This tap is the source of clean drinking water for the household. The tap is also the only high-pressure outlet in the system.

The storage tank for a typical four-bedroom house has a recommended capacity of 340 litres. A storage tank is heavy when it is full of water, and it is essential that the load is spread evenly over at least four joists. The tank must also be insulated to protect the water in the pipes from freezing in cold weather. Figs 19.18 and 19.19 show the details necessary for supporting the water storage tank as well as the necessary insulation. Fig. 19.20 shows the layout and technical specifications of the indirect cold water system.

The advantages of the indirect cold water supply system include:

- Reserve supply of water if mains fail
- Constant pressure on all taps, except the kitchen tap
- Overflow fitting fitted to storage tank to prevent water damage due to overflow.

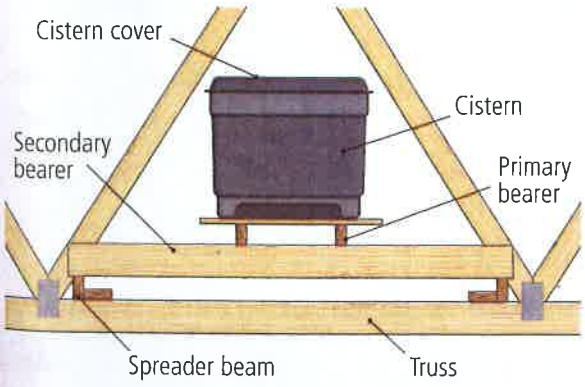


Fig. 19.18 Cold water storage tank, supported to spread the load over a mimimum of four joists.

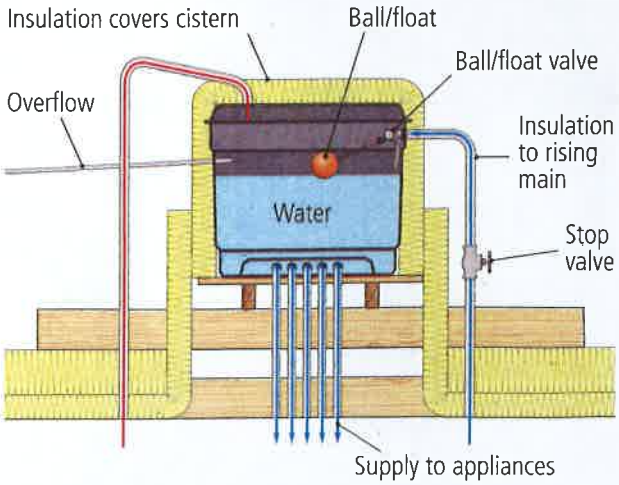
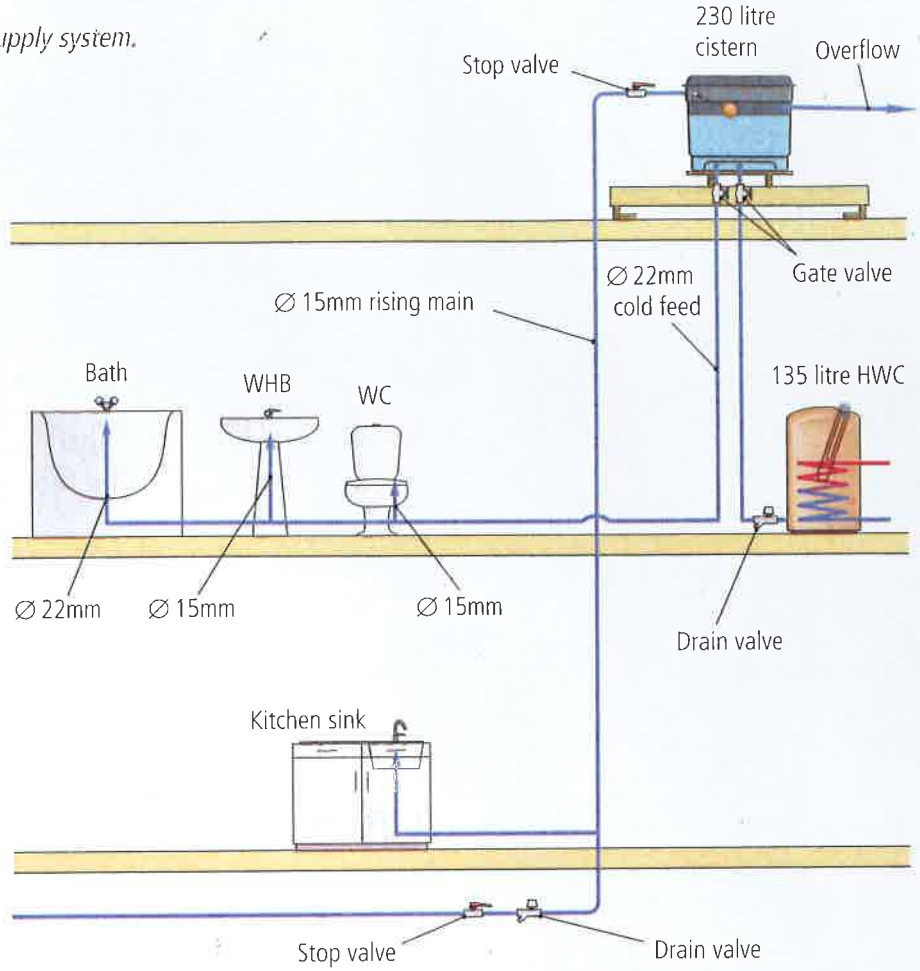


Fig. 19.19 Cold water storage tank, with tank and pipework insulated.

Fig. 19.20 Indirect cold water supply system.



The disadvantages of indirect cold water supply system include:

- Higher cost – more pipework and fittings are needed
- Large water storage tank required
- Drinking water is only available at kitchen sink.

19.21 Insulated hot ter cylinder.

HOT WATER

Hot water is not just needed in the taps around the house; it is also used to heat the building. Different appliances can be used to heat water, but some of the common ones in Irish homes are:

- Boiler (solid fuel, oil or gas)
- Back boiler (open fire or stove)
- Immersion (electric heating element fitted inside cylinder).

After it has been heated, the water is stored in a hot water cylinder. The cylinder must be well insulated to prevent the water losing heat while being stored. Fig. 19.21 shows an insulated hot water cylinder. An efficient hot water system is easy to maintain and will provide enough hot water to meet the demands of the household.

9-12-2015

SCRÚDUITHE TEASTAIS
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Recieved information
From Maurice Graham

NSAI Agrément

Joule Solar Collector Heating Systems

CERT No. 10/0555

DIN Geprüft

SOLAR KEYMARK

Solar Thermal Systems

rebird's range of solar thermal systems is arguably the most extensive on the market and offers istomers a wide choice of collectors, system configurations and accessories. Designed and anufactured to Firebird's exacting standards, our solar systems are second to none in terms of erformance, durability and efficiency. All our solar systems have been placed through rigorous sting to ensure the highest standards have been achieved.

oreover, when you purchase a Firebird product you have the back-up of our technical team and nationwide service ipport. Peace of mind from a company that has delivered premium heating products for over 30 years.

CPK7210-N Flat Panel Collector

TZ58-1800 Heat Pipe Solar Collector

CVSKC-10 Vacuum Tube Collector

Accreditations

rebird solar systems and collectors have the following accreditations.

NSAI Agrément
Firebird Envirosol Solar Heating Systems
CERT No. 11/0363

BETTER ENERGY HOMES

DIN Geprüft

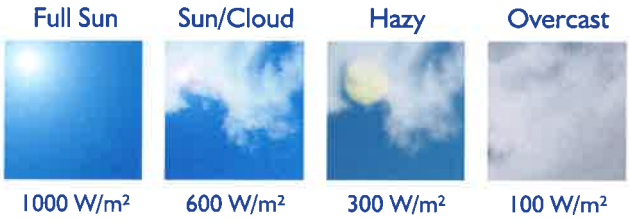
Why solar energy?

olar energy is free with the annual solar energy on the earth's surface being 10,000 times greater than the annual global energy emand. Solar thermal systems can deliver up to 70% of the hot water requirements for an average household in Ireland and in ne U.K. Installation of solar energy on a larger scale, ie. commercial, can make a great contribution to commercial energy costs.

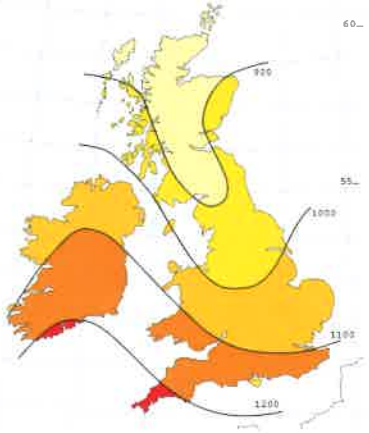
y using solar energy to heat hot water, you will be helping to reduce our dependence on fossil fuels, while improving the energy fficiency and potentially the value of your home. A typical domestic solar hot water system can save in excess of a tonne of CO_2 er annum. In particular, solar energy scores positively with the new BER - Building Efficiency Rating scheme.

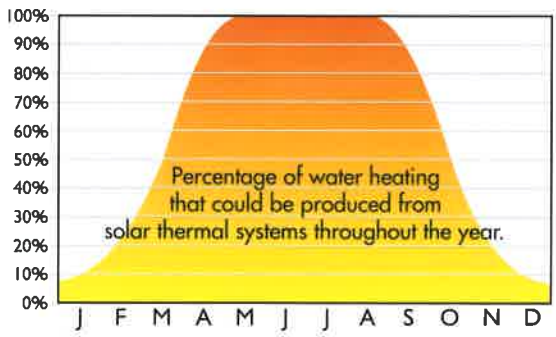
s there enough solar energy?

/hen designed correctly, solar heating could provide the total hot water requirement for the summer months and up to 30% uring winter months.



Solar power in watts per metre square absorbed by Envirosol solar panels at optimum angle during various weather conditions.



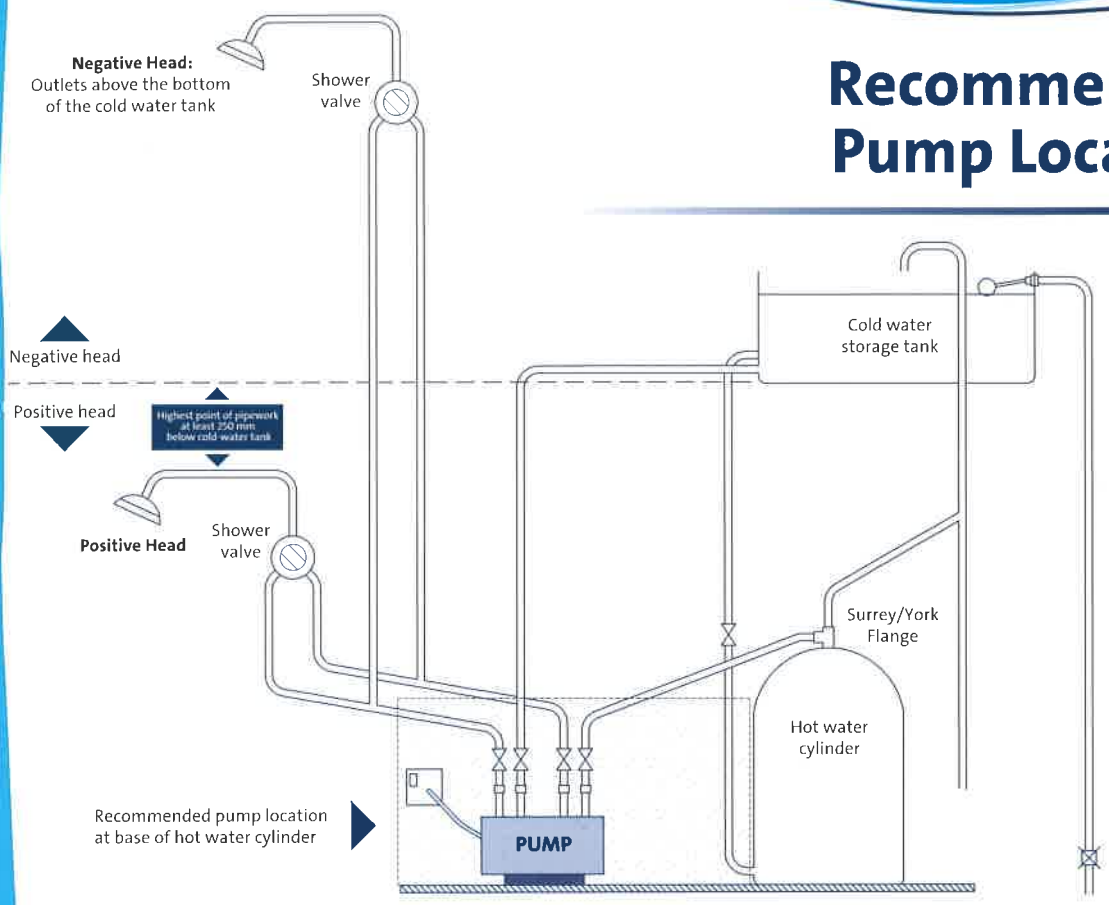


You can benefit from solar energy anywhere in Ireland and in the U.K. However, the further south you live, the more powerful the sun. Local factors will also have an effect on the radiation, including pollution free skies, local weather variations and the orientation of your roof.

It must be stressed though, that everyone can benefit from solar power. Contact our technical design department for your solar thermal system.


SAMSUNG
S-AVERTER

Recommended Pump Location



GRUNDFOS

Showering just got better...

Training

Grundfos have introduced an e-learning module which is accessible through both the web site (www.grundfos.ie) and various Merchant intranet sites.

The training module was introduced in order to be able to reach the vast majority of Installers and Merchant staff (both National and Independent), and offers the flexibility of being able to be completed at a time more convenient with those who have chosen to learn more about how shower pumps should be installed and specified. It explains everything from "what is negative head" to "where one should site the pump".

Grundfos run free training courses throughout the year, at various venues around the country. The courses are designed for merchant staff, installers and specifiers. Please visit the web site, or contact us for further information and details of forthcoming courses.

For Training

Telephone: **0845 2000 912**

Email: **wgb-sales@grundfos.com**