

Water Regulations 1999

Course & Assessment

Introductory module

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Introduction to the course

Water Byelaws have been a fact of life for plumbers as long as most of us can remember. On 1 July 1999 local Water Byelaws were replaced, by the Water Supply (Water Fittings) Regulations 1999.

This learning package has been developed by BPEC to help plumbers update their knowledge of this important legislation which is used to control the installation and use of water supply systems. The package will help you to implement Water Regulations competently, not only in new installation work, but also to ensure you are able to recognise and rectify contraventions that you come across in existing water supply systems.

Aimed primarily at practising plumbers who already have a knowledge of hot and cold water systems, the package will be of interest, and be useful, to water inspectors and anyone who is involved with the installation, design, or specification of water systems or with buildings containing water systems. It will also be of benefit to those learners with limited previous knowledge.

The package will serve – firstly, as a means of learning, and
– secondly, as a reference for future use.

The aims of this package are to enable course participants to:

- become familiar with the contents of the Water Supply (Water Fittings) Regulations 1999;
- generally understand what the Regulations mean, and recognise the role of the Regulations in preventing waste, misuse, undue consumption, contamination and erroneous measurement of water;
- know how to comply with the Regulations in practice;
- be aware of the primary legislation underpinning the Regulations;
- have an understanding of the documents used to enhance and explain the meaning of the Regulations and in particular:
 - the Regulators' Specification on the Prevention of Backflow;
 - the WRAS Water Regulations Guide;
- bring you up to a standard where you have the option of attending a BPEC Training and Assessment Centre for a One Day Training and Assessment Course.

The package

The package contains this introductory booklet, followed by 12 learning modules and finally one support document in the form of a glossary of terms.

The learning modules are supported by a video outlining the contents of the Regulations which can be found at <http://bpec.org.uk/shop/free-learning-resources/>

Contents

About this course (*general introduction to the course*)

1. Introduction, background and legislation
2. The Regulations (*a detailed look at the Regulations*)
3. Materials and substances in contact with water
4. Requirements for water fittings
5. Water system design and installation
6. Commissioning (*flushing, testing and sterilisation*)
7. Prevention of cross connection to unwholesome water
8. Backflow prevention
9. Cold water services
10. Hot water services
11. WCs, flushing devices and urinals
12. Sanitary appliances and water for outside use
- Glossary of Terms (*definitions and interpretations*)

How to tackle the work

The way in which you learn is largely up to you, but the following notes will give some guidance to those of you who feel they need it.

You should first look at the video which will take about half an hour and provide an overview of the Regulations.

Don't try to do too much at once. It is quite a deep subject, and it's probably best that you take it in easy stages, one step at a time and one module at a time.

BPEC Training and Assessment Centres will send you the Training Package at least two weeks before the Training and Assessment Course if you have chosen this route.

1. *Read the requirements of the Regulations and try to understand what they say. These are given at the start of each learning module, or in the case of Module 2 at intervals as you go through. In places the meanings will be quite plain, whilst other parts will take more consideration and thought.*
2. *Read the explanations given within the modules which should be easier to understand than the actual Regulations. This is because there are examples given of how the Regulations are applied.*
3. *Go through it more than once if you need to. The more times you look at it, the better it will stick in your memory.*
4. *Use the self-assessment questions to confirm whether you have taken it all in. These are spaced out in the modules and also serve to break the reading and give you something to stimulate your thinking. Write your answers in pencil not ink so any errors can be easily put right.*
5. *Check your answers against the model answers at the back of each learning module.*

Repeat this procedure throughout the package, and good luck in your endeavours.

Water Industry Act 1991:

Water Supply (Water Fittings) Regulations 1999

An Open Learning Course

Module 1

Introduction, background and legislation

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Introduction and background to the Regulations

The control of water supply installations in England and Wales has been radically revised by the introduction of the **Water Supply (Water Fitting) Regulations 1999**.

Following a period of deliberation and consultation, the **Secretary of State for the Department of the Environment, Transport and the Regions (DETR)** used his powers under **Sections 73, 74, 75, 84 and 213(2) of the Water Industry Act 1991 (a)** to make **Water Regulations** to control the installation and use of water fittings. This resulted in the making of the **Water Supply (Water Fitting) Regulations 1999** which came into force on **1 July 1999**.

It should be noted that these **Regulations apply only in England and Wales**. Similar provisions have been implemented by the Scottish Office and are being implemented by the Northern Ireland Office in their areas of jurisdiction.

We have in this country, a long history of Water Byelaws, administered and enforced by local water suppliers. As long ago as 1823 the Manchester and Salford Act was brought about to '*prevent the wilful and negligent use of water*', a practice in water wastage control which spread to other private and municipal water companies throughout the country.

The Water Act of 1945 formalised this arrangement by placing an obligation on water undertakers to enforce water byelaws '*for preventing waste, undue consumption, misuse or contamination of water*'. From 1945, Water Byelaws were required to be based on the Government's 'model' and needed the approval of the Government Minister with responsibility for water supply before they could be implemented. Generally, Byelaws were made to expire after a life of 10 years, after which time they were renewed and updated as became necessary.

This constant renewal of Water Byelaws continued until the latest Byelaws, based on the 1986 'model', were replaced by new Water Regulations on **1 July 1999**.

So! How do regulations differ from Byelaws?

Quite simply, **Byelaws were made locally** and applied only in the area in which they were made. For instance, Byelaws made by Thames Water applied only within the Thames Water area of supply. Thames Water were held responsible for enforcement of their own Water Byelaws.

Water Regulations on the other hand, **are National Regulations**, made by the Department of the Environment, Food and Rural Affairs (DEFRA) **and they apply to every installation in England and Wales that is supplied from a public main by a Water Undertaker**.

The responsibility for enforcement of the Regulations is placed on the Water Undertakers.

The new Regulations have similar aims to previous Byelaws, but a new way of implementing them. They are made '*as a means of preventing waste, undue consumption, misuse, contamination, and the erroneous measurement of water*'.

Whilst the aims are similar, as you go through this package you will find that there are quite a number changes in the way water fittings have to be installed and used.

What legislation is in place to control water installations in this country?

The main legislation governing the making of **Water Regulations is the Water Industry Act 1991** and **Sections 73, 74, 75, 84, and 213(2)** in particular are relevant.

- **Section 73** Offences of contaminating, wasting and misusing water etc, (legal action)
- **Section 74** Regulations for preventing contamination, waste etc and with respect to water fittings
- **Section 75** Power to prevent damage and to take steps to prevent contamination, waste etc
- **Section 84** Local authority rights of entry etc
- **Section 213(2)** Powers to make regulations.

Extracts from Section 74 are quoted below and main points highlighted:

74-(1) *The Secretary of State may by regulations make such provision as he considers appropriate for any of the following purposes, that is to say:*

(a) *for securing:*

- (ii) **that water in a water main or other pipe of a water undertaker is not contaminated, and**
- (iii) **that its quality and suitability for particular purpose is not prejudiced, by the return of any substance from any premises to that main or pipe;**

(b) *for securing that water which in any pipe connected with any such main or other pipe or which has been supplied to any premises by a water undertaker is not contaminated, and that its quality and suitability for particular purposes is not prejudiced, before it is used;*

(c) *for preventing the waste, undue consumption, and misuse of any water at any time after it has left the pipes of a water undertaker for the purpose of being supplied by that undertaker to any premises; and*

(d) *for securing that water fittings installed and used by persons to whom water is or is to be supplied by a water undertaker are safe and do not cause or contribute to the erroneous measurement of any water or the reverberation of any pipes.*

So! By briefly looking at the wording of Section 74, we can see that the Water Regulations made under the Act have been made for the following purposes:

- to make sure that **water is not contaminated, and its quality and suitability for purpose is not prejudiced,**
- to **prevent waste, undue consumption, and misuse of water** supplied by the undertaker, and
- to make sure that **water fittings installed and used are safe and do not cause or lead to erroneous measurement, or reverberation** (vibration/noise) in pipes.

In other words, the Regulations have been written to protect the water supply and to protect users against their own actions.

The Water Supply (Water Fittings) Regulations 1999

These are made in a similar format to Building Regulations and over the years prior to the Water Regulations being made, there was considerable discussion as to whether they should actually be included within Building Regulations and whether they should be enforced by Building Control Officers. After much consideration it was decided that the Water Regulations should remain separate from Building Regulations and continue to be administered and enforced by the water undertakers (suppliers).

What is in the Regulations that I should know about?

Well! You should know, or at least be aware of, pretty well everything that is in the Regulations. However, before getting into detail, let's start with a brief overview which is as follows.

The Water Supply (Water Fittings) Regulations 1999 consists of 14 Regulations which are divided into three parts and supported by three schedules.

Part I 'Preliminary' gives the date at which the Regulations came into force, it gives some interpretations to support and help us to understand the Regulations. Part I also makes statements as to how the Regulations should be applied. **Regulation 1** is supported by **Schedule 1** which describes the **five fluid categories**. (See Module 8)

Part II 'Requirements' sets out what is expected of persons installing water fittings, how water fittings should be installed and used to prevent waste or contamination and places conditions on the materials and fittings that may be used. Part II also requires **contractors to notify water suppliers of certain installations** and encourages the introduction of Approved Contractors Schemes.

Also in Part II, **Regulation 4(3)** is supported by **Schedule 2 'Requirements for Water Fittings'** which deals with the more practical aspects of the Regulations.

Part III Enforcement, as the title suggests, **deals with** aspects of **enforcement, penalties** for contravention of the Regulations, and **dispute procedures**.

Schedule 1 to the Regulations sets out fluid risk categories related to the backflow requirements of Schedule 2.

Schedule 2 to Regulation 4(3) 'Requirements for Water Fittings' consists of 31 separate requirements and really contains the 'meat' of the document, looking at the use of water fittings in all its many aspects. In fact with the exception of the first two modules, the whole of this training package deals with the requirements set out in the Schedule. In Modules 3 to 11 we will be looking at requirements for:

- **Materials** (in Module 3)
- **Requirements for water fittings** (in Module 4)
- **Design and installation** (in Module 5)
- **Commissioning** (in Module 6)
- **Prevention of cross connections** (in Module 7)

- **Backflow** (in Module 8)
- **Cold water services** (in Module 9)
- **Hot water services** (in Module 10)
- **WCs, flushing devices and urinals** (in Module 11) and
- **Sanitary appliances and water for outside use** (in Module 12)

Schedule 3 'Byelaws Revoked' supports Regulation 14 and simply lists the byelaws of the various water undertakings in England and Wales which have been taken off the Statute book and replaced with the Water Industry (Water Fittings) Regulations 1999.

Approved (Guidance) Document

Water Regulations, compared to previous byelaws are less prescriptive, and contain little in the way of technical detail other than that given in Schedule 2 'Requirements to Regulation 4(3) mentioned above.

The Department of the Environment, Food and Rural Affairs (DEFRA) has produced a **Guidance Document** to accompany the Regulations that can be used in a similar way to that of the approved documents that go with Building Regulations.

In addition to the DETR Guidance, the Water Regulations Advisory Scheme (WRAS) which from 1st April 2021 separated into two separate businesses.

1. Water Regs UK promotes compliance with the water fittings regulations and Byelaws and is responsible for operating the Water Industry Approved Plumber Scheme (WIAPS). The company has a new website www.waterregsuk.co.uk
2. Water Regulations Approval Scheme (WRAS) operates a voluntary certification scheme for plumbing products and materials. The company website is: www.wrasapprovals.co.uk One way for installers to check compliance might be to look for products certified by WRAS, Kiwa or NSF, but be aware there may be restriction how and where they are installed.

The use of the approved document is not mandatory and failure to comply with its recommendations cannot in itself lead to any liability under Regulations. However, where an installer can show that his installation is in compliance with the recommendations of the approved document, his installation can be deemed to satisfy the requirements of the Regulations.

It should be remembered also that in law **the burden of proof is with the installer**.

This means it is up to you, the installer, to show proof that your installation complies with the requirements of the Regulations.

In turn, this means you are expected to be competent in what you do. You need to have the qualifications, knowledge, and practical experience to carry out your work in a proper and **'workmanlike manner'**. (Regulation 4(5))

It is the aim of this package to help you to gain a good knowledge of Water Regulations and thus improve your competence in the installation work that you do.

So! Now some work for you. Please turn to the next page for your first set of self-assessment questions.

Water Industry Act 1991:

Water Supply (Water Fittings) Regulations 1999

An Open Learning Course

Module 3

Materials and substances in contact with water

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Introduction

The purpose of Paragraph 2 of Schedule 2 is to **ensure that** the materials we use **will not cause any contamination that will affect the drinking qualities of the water.**

Materials used in water systems should not contain any substance that might be absorbed (leached) into the water to cause the water to be toxic, or biologically unhealthy, or to affect its colour, taste, odour. Materials should not, in any way, cause the water supplied by the undertaker to become unfit to drink.

Materials include metallic and non-metallic substances (including plastics) used in the manufacture of pipes, fittings, and appliances and those used in jointing processes and for protective coatings. The list is almost endless, but suffice to say, if a material or substance is in contact with water it must not adversely affect the quality of our water.

Modules 7 and 8 will discuss water quality further.

It might be considered that substances used to produce materials, fittings and appliances etc are more the concern of the manufacturer than the installer. This is true to a large extent, because they are the people who put the substances into the materials.

Manufacturers **do** have a responsibility and most of them take that responsibility seriously.

But! You also have a responsibility!

As the person who uses the materials, you should be in a position to know which materials are permitted to be used and which of a wide variety of substances and materials you should choose for your particular installation.

Besides! As the installer, it is you who could be prosecuted for installing a harmful substance, not the manufacturer.

So! On to the learning exercise!

It is the aim of **this** module to help you decide which materials are likely to cause contamination, and which ones are approved for use, and of course, how you can be sure that you are complying with Paragraph 2 of Schedule 2.

What is the requirement?

Schedule 2: Paragraph 2:

Materials and substances in contact with water.

2.-(1) Subject to sub-paragraph (2) below, no material or substance, either alone or in combination with any other material or substance or with the contents of any water fitting of which it forms a part, which causes or is likely to cause contamination of water shall be used in the construction, installation, renewal, repair or replacement of any water fitting which conveys or receives, or may convey or receive, water supplied for domestic or food production purposes.

(2) This requirement does not apply to a water fitting downstream of a terminal fitting supplying wholesome water where:

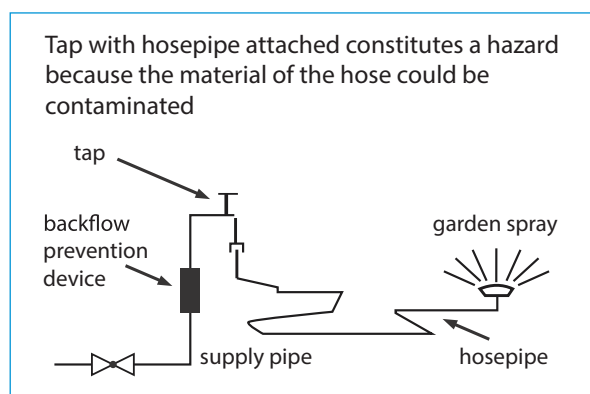
- (a) The use to which the water downstream is put does not require wholesome water; and
- (b) a suitable arrangement or device to prevent backflow is installed.

First, let's look at some of the wording

Paragraph 2 is concerned with the supply of water for domestic and food production purposes. **'Water for domestic purposes'** means wholesome water supplied by a water undertaker for general use including drinking. (See also Glossary of terms)

Paragraph 2 is also concerned with water fittings containing wholesome water.

For example, water drawn from a drinking water tap 'inside a dwelling' is considered to be 'wholesome', but once you fit a hosepipe to that tap, to connect up a washing machine, or a garden hosepipe, the situation may change and the installation may not comply with the regulations.



Any water passing through the hosepipe is considered to be 'unfit for human consumption':

- i) because the material the hosepipe is made from could cause contamination, and
- ii) because of the backflow risks associated with its use.

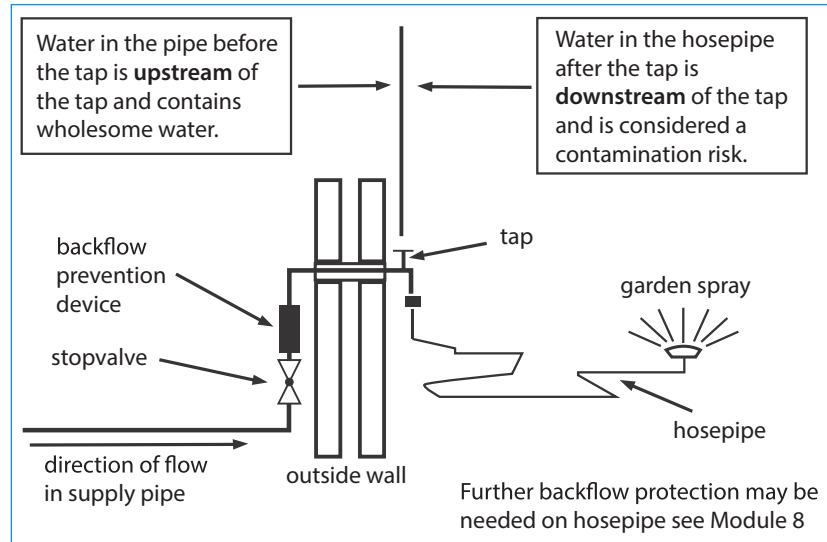
(We will look more closely at backflow prevention in Module 8.)

Sub-paragraph 2.-(2)(b) states that the previous requirement does **not** apply to water fittings **downstream** of a terminal fitting supplying wholesome water and a number of examples are given in the Guidance document. In the diagram below, water in the supply pipe up to the tap (terminal fitting) contains wholesome water, and the hosepipe and water contained in it is considered to be a contamination risk.

BUT! It is important that no water in the hosepipe (downstream) can find its way back through the tap into the supply pipe (upstream).

For this reason a backflow prevention device is required to be fitted as shown. The type of device will depend on the severity of the risk.

Hosepipes, flushing cisterns, feed and expansion cisterns, closed circuits, and overflow pipes or warning pipes are not permitted to be used to supply water for domestic purposes, so manufacturers do not necessarily need to be quite so fussy about the materials that they are made from.



However, if any of these pipes and components are to be connected to a pipe that also supplies drinking water, the drinking water supply will need to be protected from any possible contamination that these materials might cause. This of course, is done using backflow prevention devices. (Backflow is dealt with in more detail in Module 8.)

Paragraph 2 of Schedule 2 is about materials and substances in contact with water.

So! What is important about the materials we use, and what should you know about them?

Any water pipe or fitting that carries water for domestic use or for food preparation, whether it is a supply pipe or a distributing pipe, must be manufactured from a material that is not likely to contaminate the water.

There are a variety of regulations and standards governing the use of materials in the manufacture of water fittings. For example, the Guidance document suggests that non-metallic materials will be acceptable if they comply with BS 6920-1:2014.

Manufacturers will need to know this! But, what do you, the installer need to know?

How can I be sure that the materials I am purchasing are approved for use and will not cause any contamination?

Firstly, you could look to see if the material is covered by a British or European Standard Specification.

Where a product is certificated to a BS or EN Standard the manufacturer will have taken his product through a series of tests which are regularly checked under BSI or EC Quality Control schemes.

The manufacturer will want you to know that his product is to a recognised quality standard, and either the product or its packaging will be clearly marked.

It should be remembered however that British Standards Specifications are guidance documents and have no force of law **unless referred to specifically by the Regulations**.

Secondly, you should always be prepared to **take advice**, and one organisation to get advice **from**, is of course, **your local water undertaker**. Another important organisation is the **Water Regulations Advisory Scheme (WRAS)**.

Formerly known as the Water Byelaws Scheme, the **WRAS** has been carrying out fittings testing for many years and will continue to advise on Water Regulations in the future. As part of their work they produce a **Fittings and Materials Directory** which lists all approved fittings. This Directory is an important guide to all who aim to comply with or enforce water regulations.

When purchasing materials, look for these signs on the product or the packaging.

 <p>The BSI Kitemark along with the BS number shows that the product has been fully tested under BSI's quality testing scheme.</p>	 <p>The WRAS approved product symbol shows that the product has been tested for approval and is listed in the Fittings and Materials Directory.</p>	 <p>The WBS teardrop symbol, and still shown on some products tested before July 1999.</p>	 <p>The CE mark indicates that the product has been tested to EN Standards and may legally be placed on the market.</p>
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Use of identification marks on copper tube

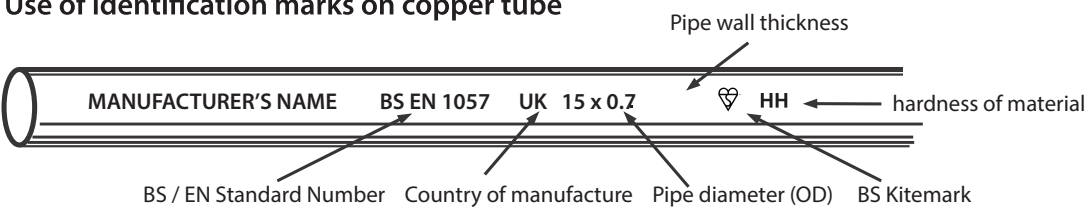


Diagram illustrating the use of identification marks on copper tube. The tube is labeled with the following information:

- MANUFACTURER'S NAME
- BS EN 1057 (BS / EN Standard Number)
- UK (Country of manufacture)
- 15 x 0.7 (Pipe diameter (OD) and Pipe wall thickness)
- BSI Kitemark (BS Kitemark)
- HH (hardness of material)

Introduction

This module looks at Schedule 2: Paragraph 16 Cold water services. It's only one paragraph but it covers quite a lot of ground.

Whilst the title is 'cold water services', Paragraph 16 is concerned mainly with cold water storage cisterns including control of incoming water, overflow pipes and warning pipes, and preventing waste and contamination in cisterns.

Here, as in many of the paragraphs of Schedule 2, the over-riding concern is that water supplied by the undertaker for domestic purposes (including drinking water), should remain wholesome.

It looks at the provision of servicing valves on inlet and outlet pipes to cisterns and at the provision of insulation for the prevention of heat losses and heat gains in cisterns.

So! These requirements are aimed at primarily at **preventing contamination of water** in any storage vessel, its distributing pipes and particularly its supply pipe.

Of secondary concern, but still very important, is that cold water storage cisterns should be installed so as to **prevent waste** or undue use of water.

So! Lets get down to business!

What are the Requirements?

Schedule 2: Paragraph 16: Cold water services

- 16.(1)** Every pipe supplying water connected to a storage cistern shall be fitted with an effective adjustable valve capable of shutting-off the inflow of water at a suitable level below the overflowing level of the cistern.
- (2)** Every inlet to a storage cistern, combined feed and expansion cistern, WC flushing cistern or urinal flushing cistern shall be fitted with a servicing valve on the inlet pipe adjacent to the cistern.
- (3)** Every storage cistern, except one supplying water to the primary circuit of a heating system shall be fitted with a servicing valve on the outlet pipe.
- (4)** Every storage cistern shall be fitted with:
- (a)** an overflow pipe, with a suitable means of warning of an impending overflow, which excludes insects;
 - (b)** a cover positioned so as to exclude light and insects.
 - (c)** thermal insulation to minimise freezing or undue warming.
- (5)** Every storage cistern shall be so installed as to minimise the risk of contamination of stored water. The cistern shall be of an appropriate size, and the pipe connections to the cistern shall be so positioned, as to allow free circulation and to prevent areas of stagnant water from developing.

What is important about cold water storage cisterns?

There are a number of points to be considered here, inlet and outlet pipes, control valves, warning pipes and overflow pipes, water levels, cistern support, prevention of contamination, materials for cisterns insulation and siting of cisterns.

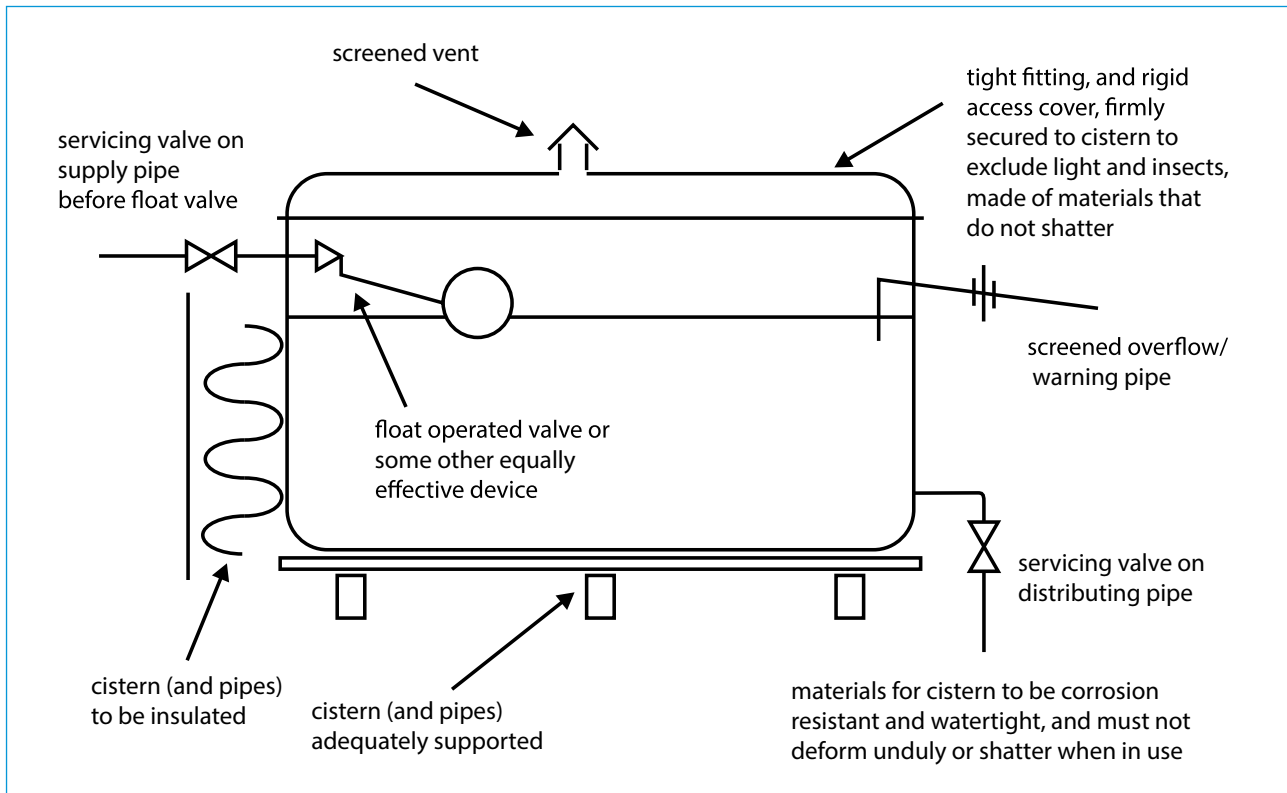
So let's take it step by step!

First a general look at cisterns and what is required of them.

For cold water services storage cisterns to comply with the requirements of the Water Supply (Water Fittings) Regulations & Scottish Water Byelaws the complete installation must be designed and installed so that:

- it is of an appropriate quality and standard
- the risk of contamination is minimised
- it incorporates essential design features (inlet and outlet arrangements, overflow and warning pipe provision) and correctly installed

The following diagram illustrates a number of points that apply to all cisterns used to supply water for drinking and domestic purposes. Take note of these.



All components making up a cold water storage cistern, including the inlets, outlets and servicing valves must conform to the requirements of Regulation 4.

In general cisterns should be:

- fitted with an effective inlet control device to maintain the correct water level;
- fitted with servicing valves on inlet and outlet pipes;
- fitted with a screened warning/overflow pipe to warn against impending overflow;
- covered so to exclude light or insects, and
- insulated to prevent heat losses and undue warming;
- installed so that risk of contamination is minimised, and
- arranged so that water can circulate and stagnation will not occur;
- supported to avoid distortion or damage that might cause them to leak;
- readily accessible for inspection and cleansing;
- all non-metallic materials in contact with the contents, including any surface where condensation forms, must comply with the requirements of BS 6920.

Of the points mentioned most of them we have already dealt with to some degree in previous modules. As you can see there is some overlap in what is covered by some paragraphs of Schedule 2 and in order to understand what is meant by each individual paragraph we also need perhaps to go over some of the ground again.

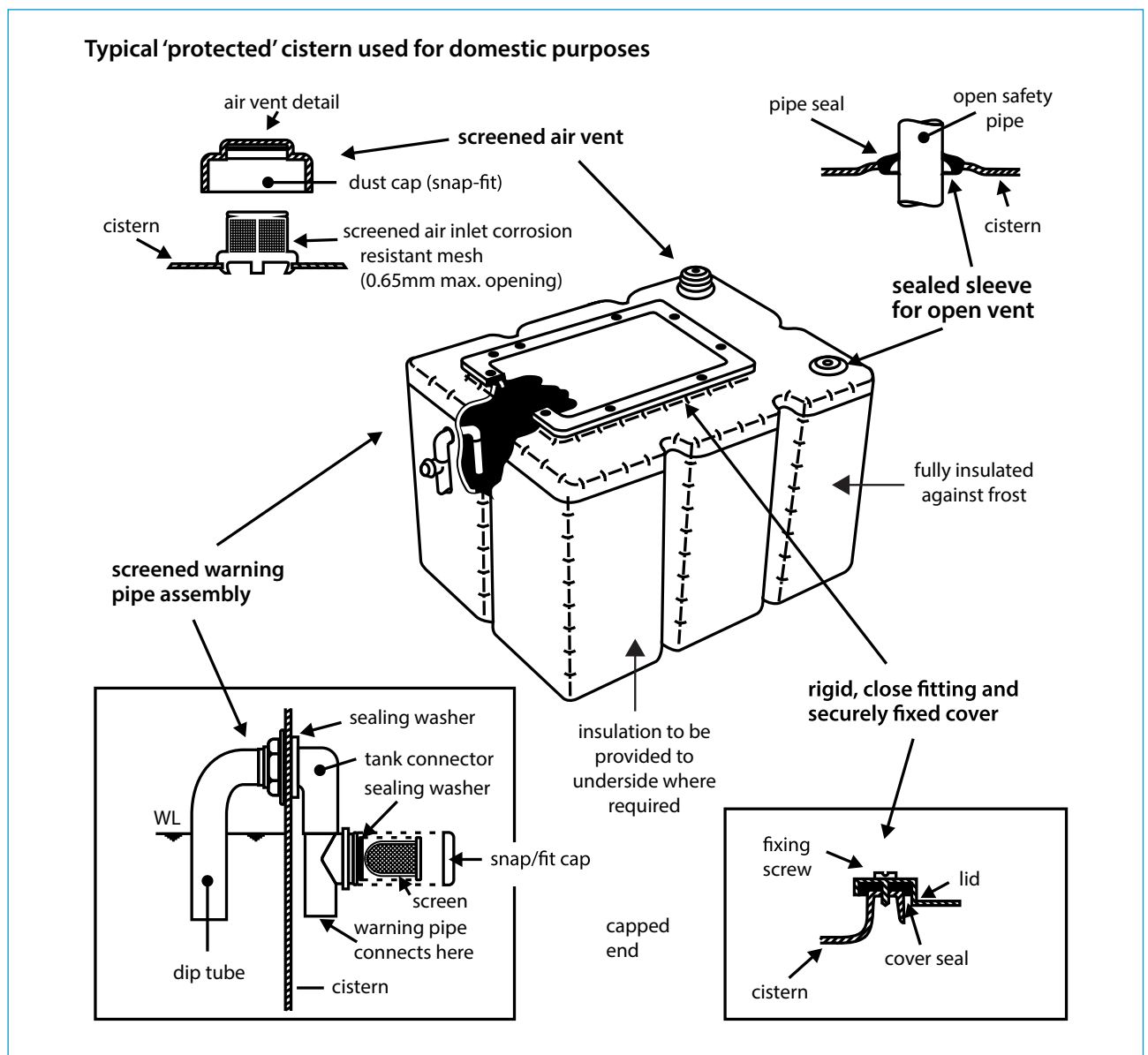
Cisterns used for domestic purposes

Most cisterns, and particularly those in dwellings, are used in some way to store water for domestic purposes. This means that in addition to the points listed in the diagram on page 4, cisterns for domestic purposes must be arranged so as to prevent contamination from occurring in the cistern water.

You will be familiar with the old 'byelaw 30' cistern requirements, and similar requirements are still valid under the Regulations.

The following diagram illustrates the requirements for cisterns for domestic purposes and cisterns that are used to store drinking water.

These are often termed 'protected' cisterns and contain water of drinking quality conforming to fluid category 1.



Are there any rules relating to cistern connections and control valves?

The simple answer is **Yes!** But you will need a more detailed answer which looks at inlet and outlet control valves, overflow and warning pipes, contamination and frost protection. More details follow.

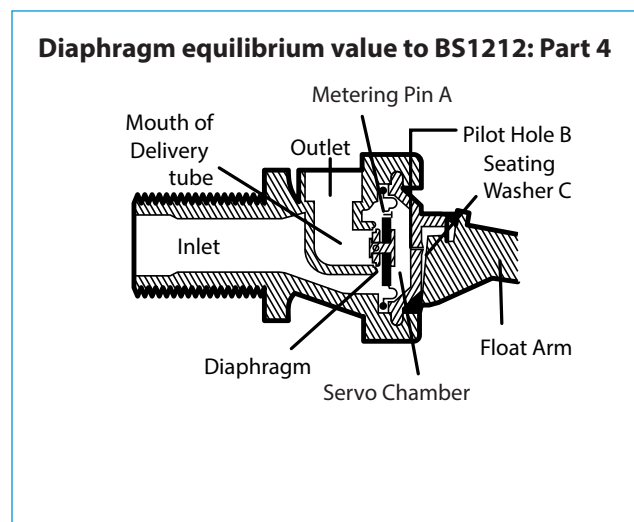
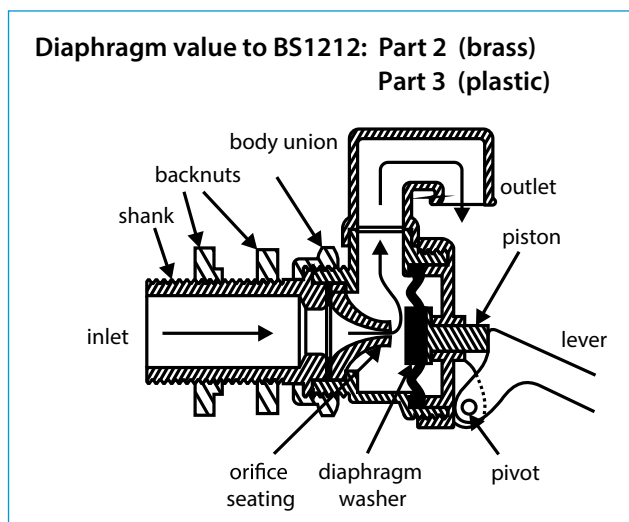
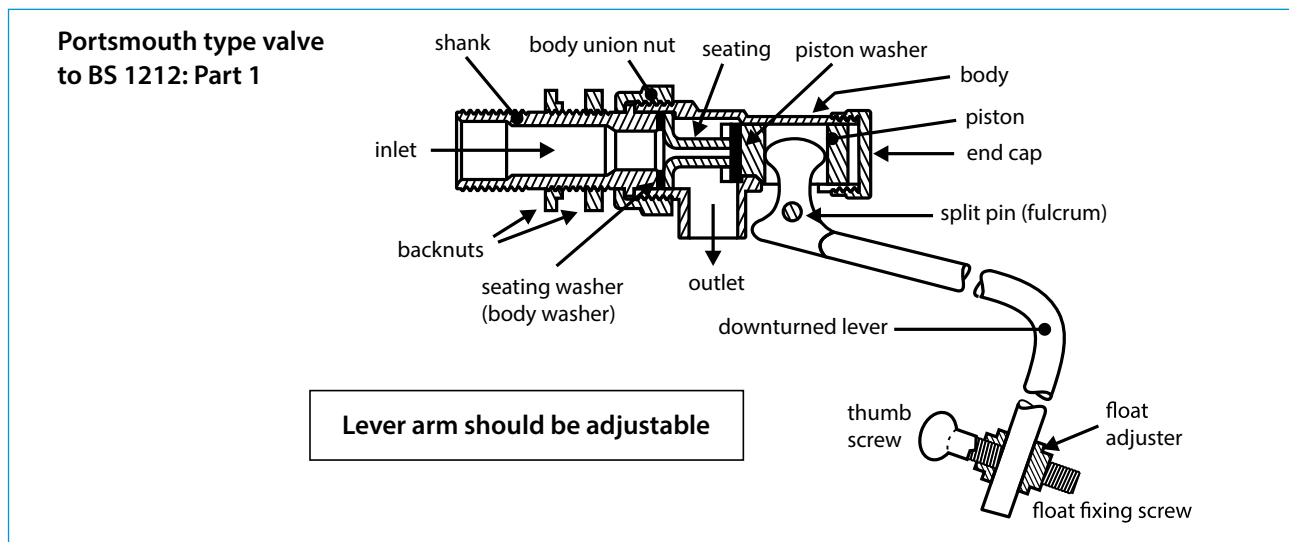
Cistern inlet controls

Paragraph 16(1) requires **every pipe supplying water to a storage cistern to be fitted with an effective adjustable shut off device** that will close when the water reaches its normal full level, and you must be able to adjust the water level in the cistern.

Normally this device will be a float operated valve such as those illustrated below, but on larger cisterns it could be a float switch control connected to an electrically operated valve or pump.

Where a float operated valve is used in a water storage cistern it should comply with one of the following standards:

- BS 1212: Part 1 Portsmouth type
- BS 1212: Part 2 Diaphragm valve made of brass
- BS 1212: Part 3 Diaphragm valve made of plastic



Note: Float operated valves used in WC cisterns should comply with either BS 1212: Parts 2, 3 or 4. The valve to BS 1212: Part 4 is designed for use in WC cisterns.

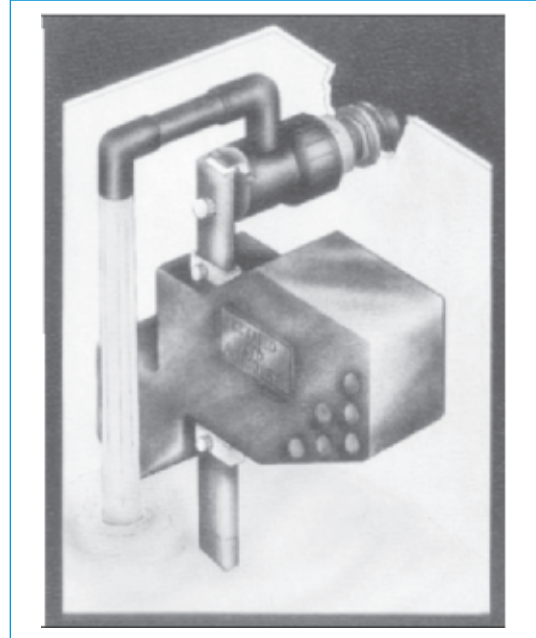
What about cistern inlet control valves that do not comply with the standards listed above?

There are a number of these! For instance, BS 1212 only covers float valves up to 50mm (2") in diameter.

Another example is the innovative valve shown here which has a ceramic disc valve arrangement and which is WRAS approved.

So! If you intend to fit a valve to a cistern that is not to BS 1212 or is of a size larger than 50mm, you will need to make certain that it meets with approval under Water Regulations. You have three options open to you, either:

- i) to look in the Water Fittings and Materials Directory, if it is listed it can be used;
- ii) telephone the Water Regulations Advisory Scheme for advice; or
- iii) check with your local water undertaker.



Other cistern control valves

Inlet pipes to cisterns are required under Paragraph 16(2) **to have a servicing valve fitted immediately before connection to the cistern** to provide individual control to the float operated valve.

This rule applies to all cisterns including water storage cisterns, feed and expansion cisterns, WC flushing cisterns and urinal flushing cisterns.

Paragraph 16(3) requires **outlet pipes from cisterns to be fitted with servicing valves. The best position for the valve**, to comply with the Regulations, is as near to the point of connection to **the cistern** as is reasonably practical.

However, it may be permissible to fit servicing valves in an airing cupboard providing the distance from the cistern is short.

This rule applies to all distributing pipes and cold feed pipes from cisterns with one exception.

Cold feed pipes to primary heating circuits do not need to be fitted with a servicing valve because only small amounts of water are wasted when draining down, and it could lead to a dangerous situation if such a valve was inadvertently turned off.

What about overflow pipes and warning pipes

Water Byelaws used to be concerned with both warning pipes and overflow pipes but now Paragraph 16(4)(a) of Schedule 2 simply says that ‘– every storage cistern shall be fitted with an overflow pipe, with a suitable means of warning of an impending overflow –’.

However, to comply with the Regulations you may need in some cases to fit both an overflow pipe and a warning pipe or some other means of warning that an overflow is likely to occur. This module follows the guidance document in retaining the distinction between an overflow pipe and a warning pipe and is written accordingly.

The provision of overflow pipes and warning pipes may vary depending on the capacity of the water storage cistern, but first, perhaps you should be sure you know how a warning pipe differs from an overflow pipe.

‘Overflow pipe’ means a pipe from a cistern in which water flows only when the water level in the cistern reaches a predetermined level’ (paragraph 1) It is used to discharge any overflowing water where it will not cause damage to the building, usually caused by a float operated valve that is letting by.

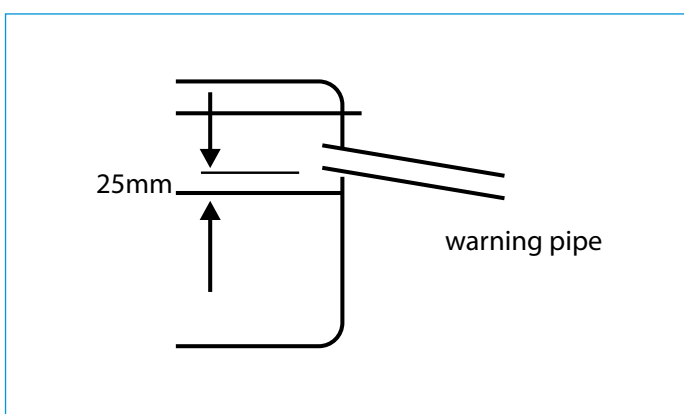
A **‘warning pipe’** is an overflow pipe used to give warning to the owners or occupiers of a building that a cistern is overflowing and needs attention.

See also definitions.

So how does the size of the cistern affect the provision of overflow pipes and warning pipes?

To answer this, it is perhaps best to look at some diagrams of cisterns of various sizes to see clearly how warning pipes and overflow pipes may be arranged to meet the requirements of the Regulations.

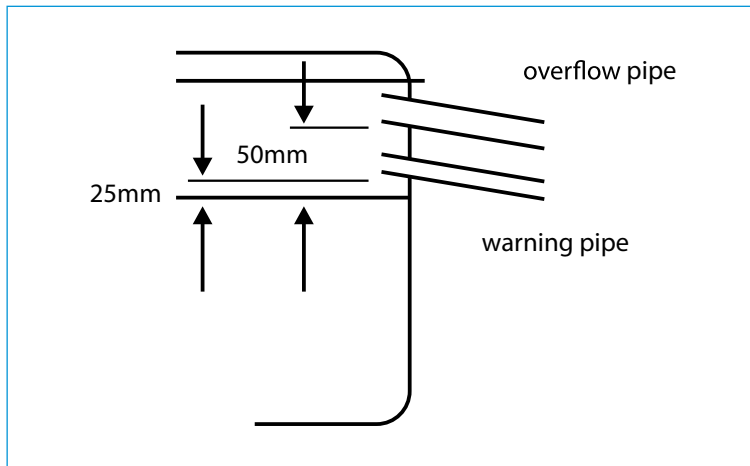
(a) Small cisterns of up to 1000 litres capacity



A combined overflow/warning pipe may be accepted on small cisterns with a capacity of 1000 litres or less

(b) Medium cisterns greater than 1000 litres and up to 5000 litres capacity

Cisterns with a capacity greater than 1000 litres should be capable of being inspected and cleansed without having to be wholly uncovered.



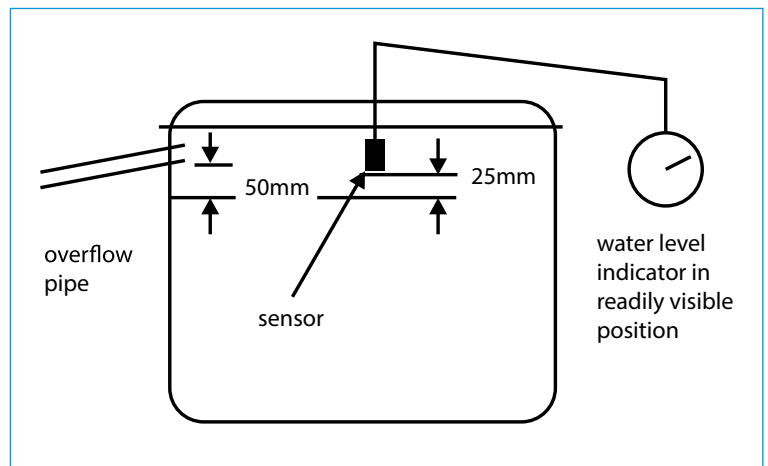
Medium cisterns must be fitted with a warning pipe and an overflow pipe

(c) Large cisterns greater than 5000 litres and up to 10,000 litres capacity

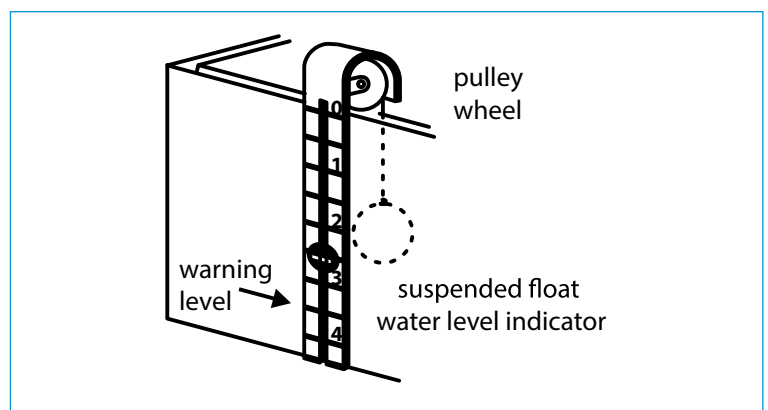
These are required to be fitted with any one of a variety of warning/overflow devices which may include the following:

i) a **warning pipe and an overflow pipe** as for medium cisterns, (see sketch of medium cistern above) or

ii) cistern with **electrically operated warning device** which should be readily visible and show clearly when the water level is at the point of overflowing, and an overflow pipe or



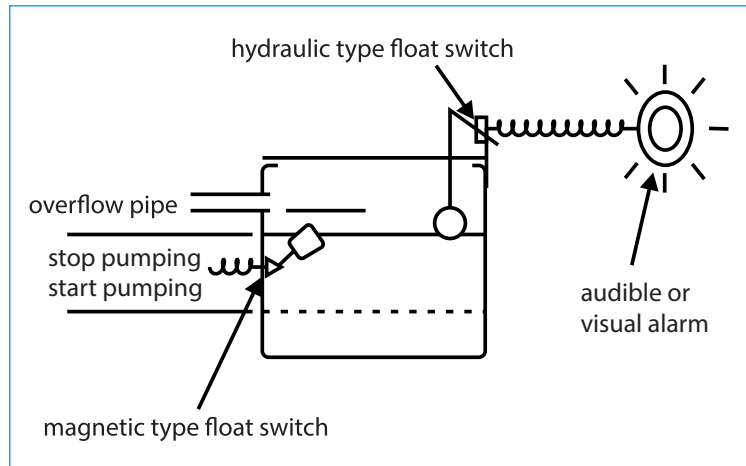
iii) a **float operated water level indicator**, and an overflow pipe



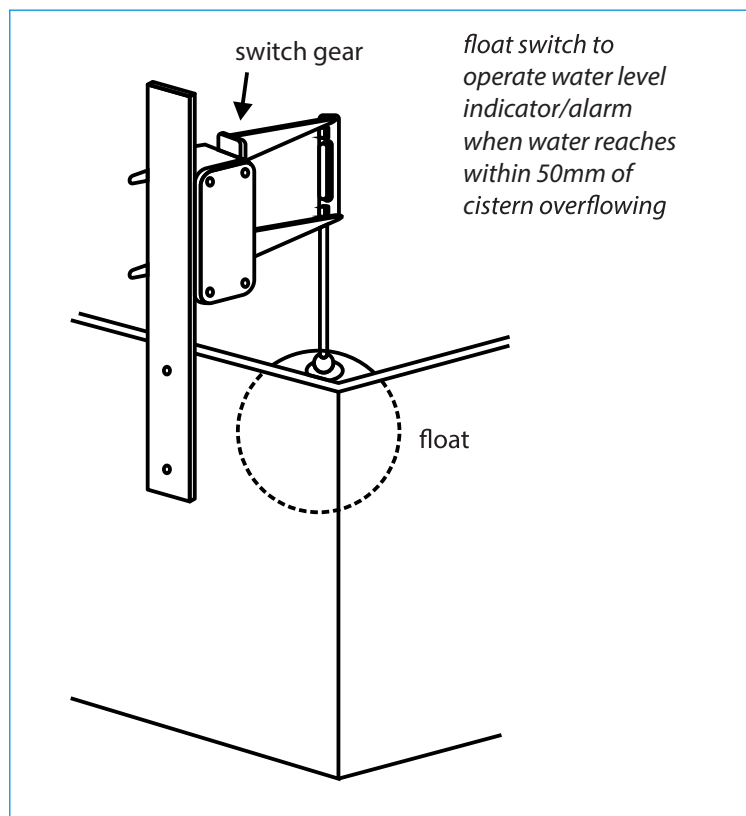
(d) Very large cisterns of more than 10,000 litres capacity

These should be fitted with one of the following:

- i) a warning pipe and an overflow pipe as for medium and large cisterns
- ii) an electrically operated audible or visual alarm which clearly shows when the water level rises to within 50mm of the cistern overflowing level, and an overflow pipe



- iii) a hydraulically operated, audible or visual alarm that clearly shows when the water level rises to within 50mm of the cistern overflowing level, and an overflow pipe

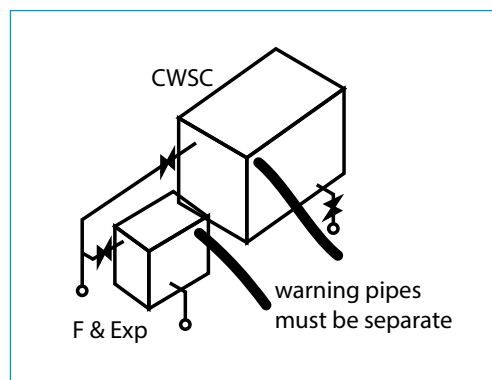


Note: the overflowing level is the point at which water begins to flow over the invert (lowest inside) of the warning pipe.

What else is important about overflow and warning pipes?

There are a number of points still to consider if your installations are to comply with the Regulations. Eight important points are set out below.

- (a) In the event of the inlet control device becoming defective, the **overflow/warning pipe should be capable of removing the excess water without the inlet becoming submerged** (even in severe situations. e.g. float comes adrift).
- (b) **Warning/overflow pipe to fall continuously from its cistern connection to its point of discharge.**
- (c) **Warning pipes to discharge in a conspicuous position**, preferably outside the building.
- (d) **Warning pipes from feed and expansion cisterns should be separate from those serving storage cisterns.**
- (e) **When two or more storage cisterns have a common warning pipe or overflow pipe, they should be arranged so that one cistern cannot discharge into another.**
- (f) Overflow and warning pipes should be positioned so as to exclude light and screened to prevent the ingress of insects and other foreign bodies. Screen mesh size should not exceed 0.65mm (opening). See diagram page 6.
- (g) Every storage cistern must be constructed and installed so that they can be easily inspected (both externally and internally) and cleansed. For ease of installation, maintenance and replacement float operated valves and other controls must be readily accessible, the minimum unobstructed clearance above a cistern is 350mm.
- (h) Every cold water storage cistern should be adequately supported to avoid distortion or damage. Refer to Part G of the Building Regulations provide further information and advice.



What else does Paragraph 16 say about water storage cisterns?

Paragraph 16(4)(b) requires the **cistern to be fitted with 'a cover positioned so as to exclude light and insects.'** The diagram on page 5 illustrates this.

Paragraph 16(4)(c) says that **insulation shall be fitted to minimise freezing or undue warming.** This has been dealt with in Module 4 and does not need to be repeated now, except to say that any **insulation should include the overflow pipe or warning pipe.**

Isn't there a contamination aspect to Paragraph 16?

Yes there is! Paragraph 16(5) requires '**cisterns to be installed to minimise the risk of contamination of stored water**'. This requirement can be met to a large extent by installing a 'protected' cistern in all cases but in particular for those supplying water for domestic purposes. In other words, we should install what was formerly called a 'Byelaw 30 cistern'.

However, this paragraph goes a little further in that **cisterns are required to be 'of an appropriate size and connections positioned to allow circulation and prevent areas of stagnation from developing'**.

There are a number of potential causes of contamination in cisterns, and the following points should be borne in mind when cisterns are designed and installed.

1. Cisterns MUST be kept clean.

- They should be flushed and sterilised when installed, and
- should be regularly cleaned and maintained when in use (every six months)

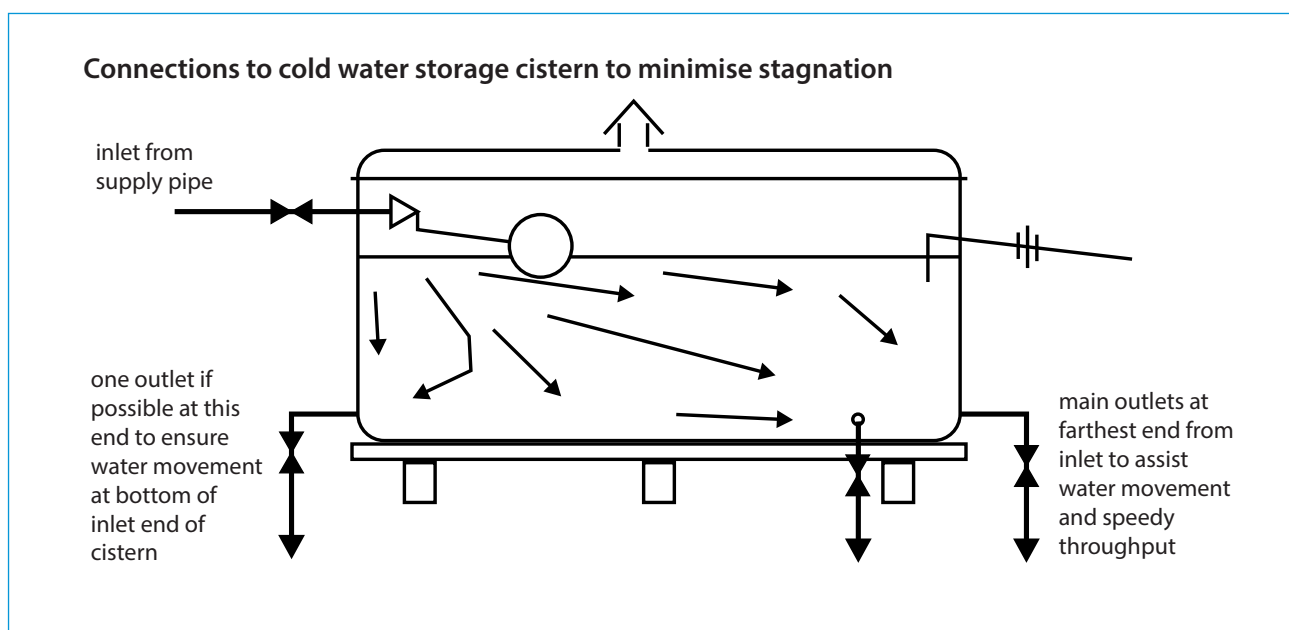
2. Water must be kept moving with speedy replenishment of ALL stored water.

Cisterns should be adequately sized of course, but it is important that they are not oversized. Since the relatively recent outbreaks of legionella it is considered that many storage cisterns have been oversized in the past with a very slow throughput that may permit water in parts of the cistern to remain unchanged for quite long periods, resulting in stagnation.

3. **Outlet connections should be as low as possible** to permit sediment to pass through to taps rather than settle on the bottom of the cistern
4. **Outlet connections should be arranged so as to encourage movement of water** throughout the cistern and thus achieve regular replacement of stored water.

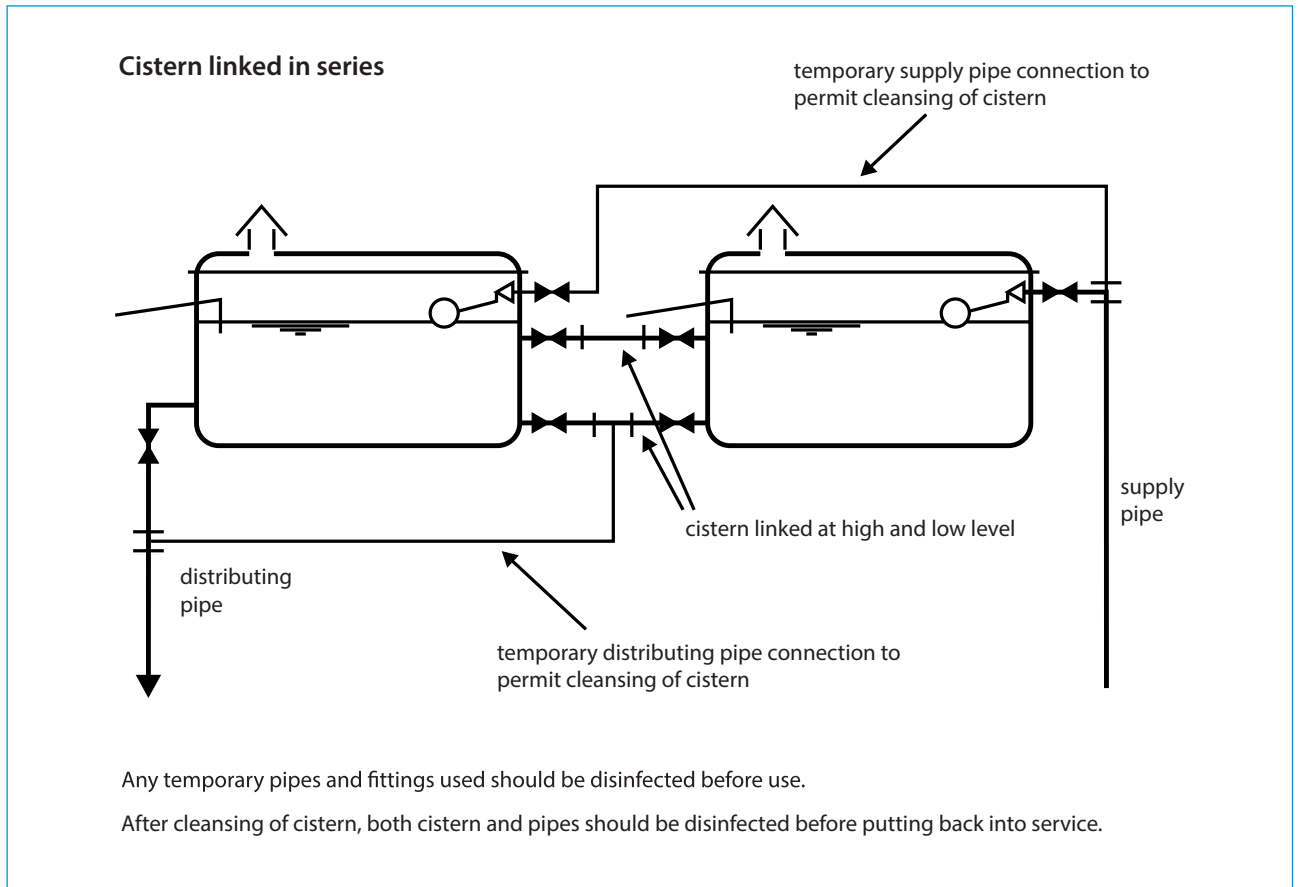
At least one outlet should be positioned at the opposite end of the cistern to the inlet connection.

This will also help throughput.



5. **Linked cisterns** should be arranged so that they can be easily drained and cleaned, and so that accumulations of debris at the base of the cistern is discouraged.

Cisterns connected in series are generally preferred to maintain a good throughput and to reduce the risk of stagnation.



The following is a selection of definitions and interpretations extracted from

the Water Industry Act 1991

the **“Director”** means the Director General of Water Services; (Para 218)

“Food production purposes” means the manufacturing, processing, preserving or marketing purposes with respect to food or drink for which water is supplied to food production premises may be used, and for the purposes of this definition, **“food production premises”** means premises used for the purposes of a business of preparing food or drink for consumption otherwise than on the premises; (Para 93)

“house” means any building or part of a building which is occupied as a dwelling-house, whether or not a private dwelling-house, or which, if unoccupied, is likely to be so occupied. (Para 219)

“house” will include a house, bungalow, flat or similar dwelling

“local authority” means the council of a district or of a London borough or the Common Council of the City of London; (Para 219)

In other words your local district or town council

“private supply” means.... a supply of water provided otherwise than by a water undertaker.....; (Para 93)

“Private supply” will include any supply of water not supplied by a water undertaker, irrespective of its source.

The Regulations apply only to water supplied by a water undertaker.

“water fittings” includes pipes (other than water mains), taps, cocks, valves, ferrules, meters, cisterns baths, water closets, soil pans and other similar apparatus used in connection with the supply and use of water. (Para 93)

Within the Regulations, ‘water fittings’ is a general term given to a variety of separate fittings and includes pipes, taps, valves, meters, cisterns and cylinders, baths, water closets and other sanitary appliances, boilers and hot store vessels, washing machines, etc.

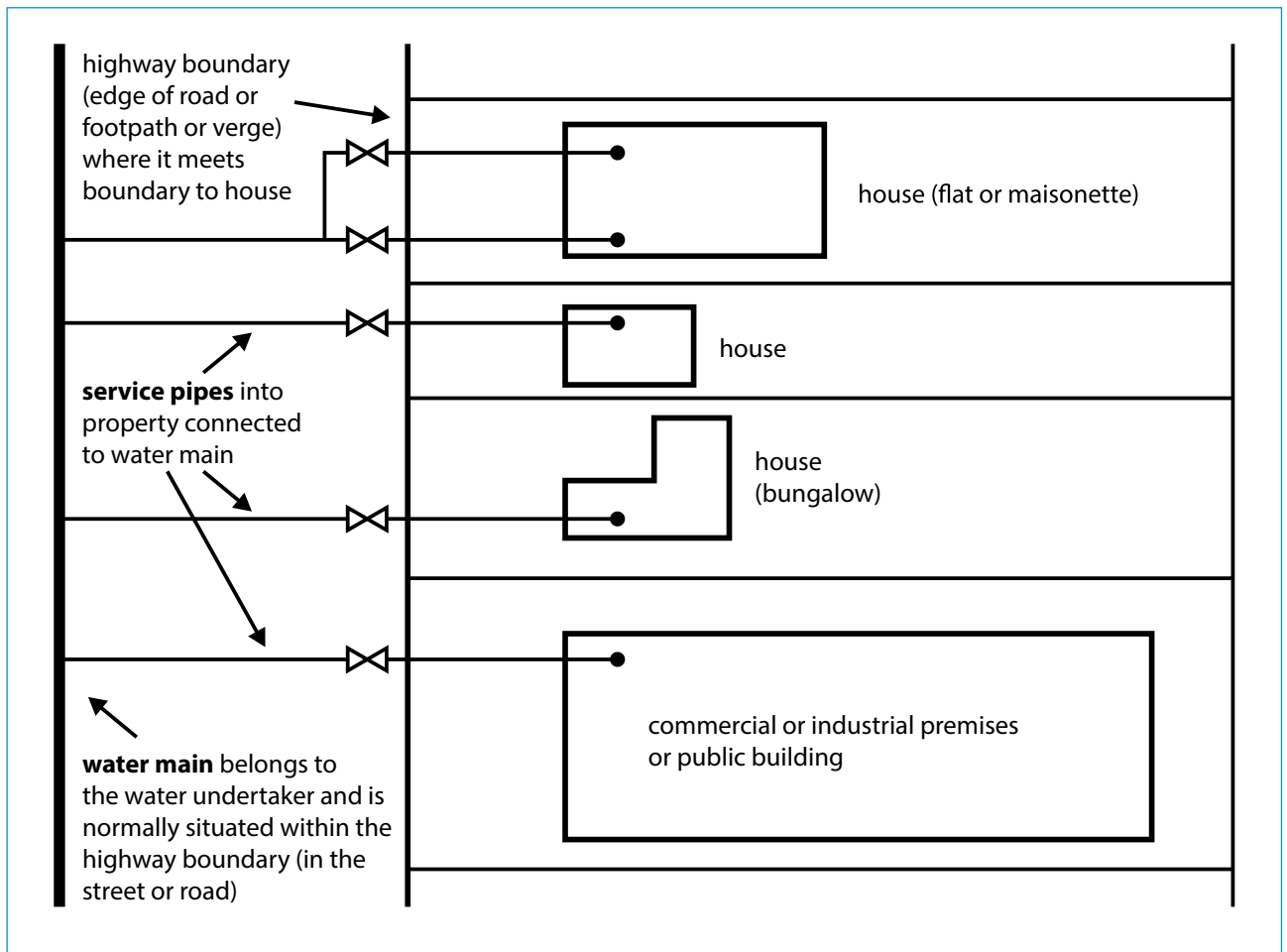
In fact, if any item within premises contains or uses water supplied by the water undertaker, it is considered to be a water fitting.

“water for domestic purposes” refers to water used for ...drinking, washing, cooking, central heating, and sanitary purposes ...in a house or a building used mainly as a house. It also includes ...the washing of vehicles and the watering of gardens ...providing the ...water is drawn from a tap within the house and without the use of a hosepipe. (Para 218)

“service pipe” means ...so much of a pipe which is, or is to be, connected with a water main for supplying water from that main to any premises as is to be subjected to water pressure from that main, or would be so subject but for the closing of some valve...
(Para 219)

“water main” means any pipe ...which is used by a water undertaker for the purpose of making a general supply of water available to customers or potential customers ...
(Para 219)

This is the main in the street from which a service pipe is connected to serve a house or other premises.



The following is a selection of definitions and interpretations extracted from

the Water Supply (Water Fittings) Regulations 1999

“the Act” means the Water Industry Act 1991;

“approved contractor” means a person who:

- (a) has been approved by the water undertaker for the area where a water fitting is installed or used, or
- (b) has been certified as an approved contractor by an organisation specified in writing by the regulator;

Reference is made to ‘approved contractors’ in Regulations 5, 6 and 7, where the Water Supply Industry is encouraged to set up Approved Contractors Schemes.

“the Directive” means Council Directive 89/106/EEC on the approximation of laws, regulations and the administrative provisions of the member States relating to construction Products (b);

“The Directive” (Council directive 89/106/EEC etc) refers to ‘Construction Products Directive (a)’ which is an instruction that, under European law, requires a product (pipe fitting etc) to be fit for its intended use. If a product meets all the essential specifications under this European law, manufacturers are entitled to use the EC mark and Member States are obliged to permit its use providing it meets with all the relevant standards and of the country in which the product is used.

“EEA Agreement” means the agreement on the European Economic Area signed at Oporto on 2nd May 1992(c) as adjusted by the Protocol signed at Brussels 17th March 1993(d);

“EEA State” means a State which is a contracting party to the EEA Agreement;

In simple terms, there are the countries in the European Community plus Norway, Iceland and Liechtenstein.

“European technical approval” means a favourable technical assessment of the fitness for use of a construction product for an intended use, issued for the purpose of the Directive by a body authorised by an EEA State to issue European technical approvals for those purposes and notified by that State to the European Commission;

‘European technical approval’ means a favourable technical assessment of the fitness for use of a construction product, issued by a body such as the British Standards Institute which is authorised by the European Commission to issue European technical approvals.

“fluid category” means a category of fluid described in Schedule 1 to these regulations; (see page 7)

“harmonised standard” means a standard established as mentioned in the Directive by the European standards organisation on the basis of a mandate given by the Commission of the European Economic Community and published by the Commission in the Official Journal of the European Communities;

A ‘harmonised standard’ is a standard produced by representatives of the various European countries within the European Standards Organisation. The standard being written and agreed, first by committee, then ratified by the Commission (Parliament) of the European Economic Community.

“material change of use” means a change in the purpose for which, or the circumstances in which, premises are used, such that after that change the premises are used (where previously they were not sused):

- i) as a dwelling;
- ii) as an institution;
- iii) as a public building; or
- iv) for the purpose of the storage or use of substances which if mixed with water result in a fluid which is classified as either fluid category 4 or 5;

‘Material change of use’ means a change in the purpose for which, or the circumstances in which, premises are used. For example a house (dwelling) that is turned into a nursing home (institution) or a church (public building) that is turned into a dwelling. In both cases there are changes in use that affect the requirements of the Regulations.

Under ‘**material change of use**’ four types of premises are listed (but not defined). Definitions for these are given below:

- i) **a dwelling** is a place where people live e.g. house, flat, bungalow etc.
- ii) **an institution** is a building that provides living accommodation for, or for the treatment or care of, people suffering from illness or disability or those who are unable to care for themselves. Examples include certain hospitals, schools, homes for the young or old, but not day centres.
- iii) **a public building** can be described as premises designed and built for use by the general public including such buildings as theatres, schools or colleges of education, public libraries, halls where people meet, and places of worship.
- iv) **buildings used for the storage or use of substances of fluid category 4 or 5.** This can include any type of building providing the said substances are stored.

Note: the above do not give definitive lists of examples.

“regulator” means:

- (a) in relation to any water undertakers whose area of appointment is wholly or mainly in Wales and their area of appointment, The National Assembly for Wales;
- (b) in relation to all other water undertakers and their area of appointment, the Secretary of State;

“supply pipe” means so much of any service pipe that is not vested in the undertaker; and Paragraph 1 of Schedule 2 has effect for the purposes of that Schedule. (See also page 11)

The following selection of definitions and interpretations is extracted from:

Schedule 1 of the Water Supply (Water Fittings) Regulations 1999

Fluid categories

Fluid category 1

Wholesome water supplied by a water undertaker and complying with the requirements of regulations made under Section 67 of the Water Industry Act 1991(a)

Fluid category 2

Water in fluid category 1 whose aesthetic quality is impaired owing to:

- (a) a change in its temperature, or*
- (b) the presence of substances or organisms causing a change in its taste, odour or appearance including water in a hot water distributing system*

Fluid category 3

Fluid which represents a slight health hazard because of the concentration of substances of low toxicity, including any fluid which contains:

- (a) ethylene glycol, copper sulphate solution or similar chemical additives, or*
- (b) sodium hypochlorite (chlorox and common disinfectants)*

Fluid category 4

Fluid which represents a significant health hazard because of the concentration of toxic substances, including any fluid which contains:

- (a) chemical, carcinogenic substances or pesticides (including insecticides and herbicides), or*
- (b) environmental organisms of potential health significance.*

Fluid category 5

Fluid representing a serious health hazard because of the concentration of pathogenic organisms, radio active or very toxic substances. including any fluid which contains:

- (a) faecal matter or other human waste;*
- (b) butchery or other animal waste; or*
- (c) pathogens from any other source.*

Note: A comprehensive list of examples is shown in Tables 6.1 on pages 10 to 12 of Manual 8.

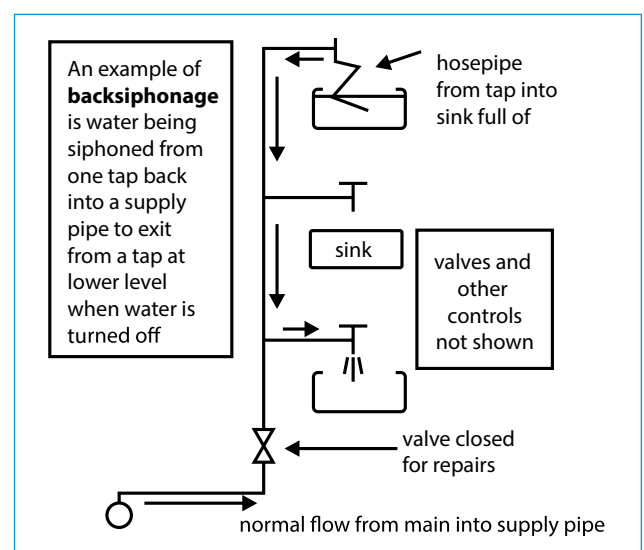
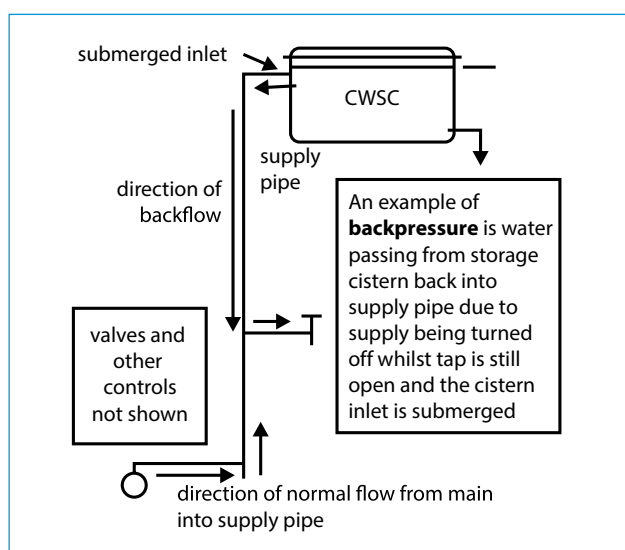
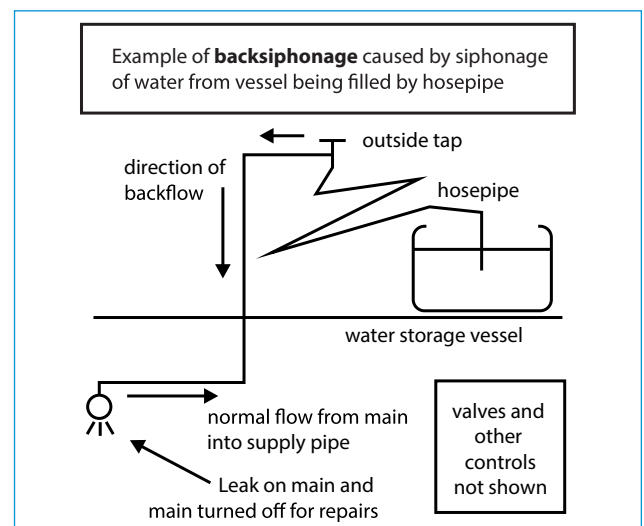
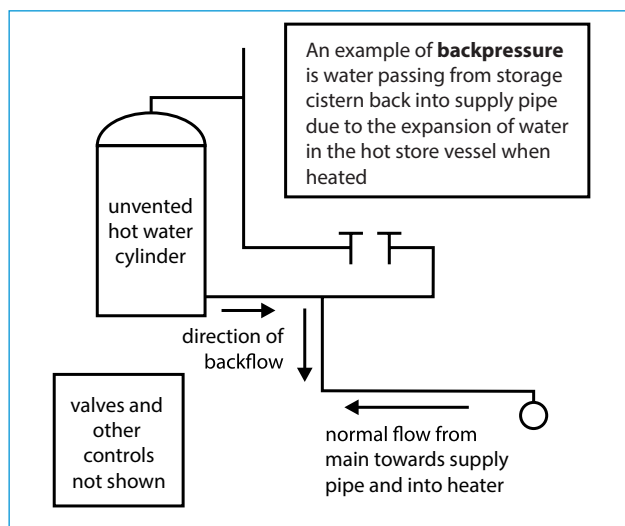
The following selection of definitions and interpretations is extracted from:

Schedule 2 of the Water Supply (Water Fittings) Regulations 1999

“**backflow**” means movement of fluid from downstream to upstream within an installation due to:

- backpressure**, that is pressure generated at any point in a system which is greater than the pressure upstream of that point at the same elevation, or
- backsiphonage**, that is pressure generated at any point in a system which is greater than the pressure upstream of that point at the same elevation;

Backflow can be said to be flow in a direction contrary to the normal intended direction of flow

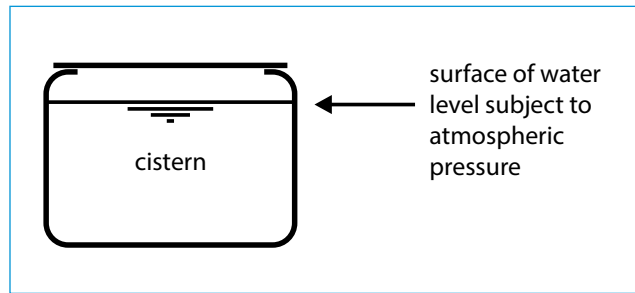


“**contamination**” includes any reduction in chemical or biological quality of water due to raising its temperature or the introduction of polluting substances;

“cistern” means a fixed container for holding water at atmospheric pressure;

“storage cistern” means a cistern for storing water for subsequent use, not being a flushing cistern.

Cistern can include a feed and expansion cistern, feed cistern, or storage and feed cistern

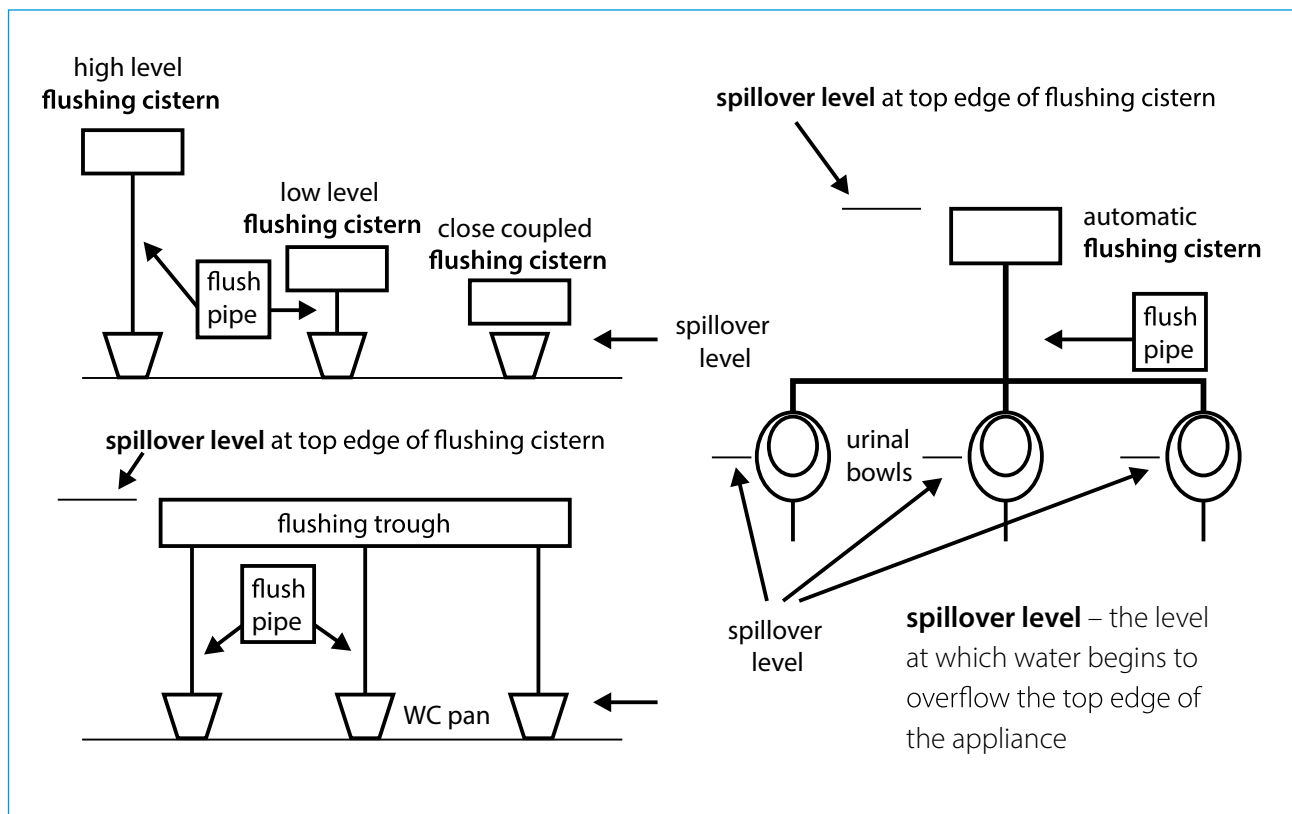


“flush pipe” means a pipe conveying water from a flushing cistern or flushing valve to a water closet pan or urinal;

“flushing cistern” means a cistern provided with a valve or device for controlling the discharge of the stored water into a water closet pan or urinal;

“flushing trough” means a flushing apparatus which combines several discharging units into a single cistern to allow frequent flushing of two or more water closet pans;

“spillover level” means the level at which the water in a cistern or sanitary appliance will first spill over if the inflow of water exceeds the outflow through any outflow pipe and any overflow pipe;



“pressure flushing cistern” means a WC flushing device that utilises the pressure of water within the cistern supply pipe to compress air and increase the pressure of water available for flushing a WC pan;

“pressure flushing valve” means a self-closing valve supplied with water directly from a supply pipe or a distributing pipe which when activated will discharge a pre-determined flush volume;

“combined feed and expansion cistern” means a cistern for supplying cold water to a hot water system without a separate expansion cistern;

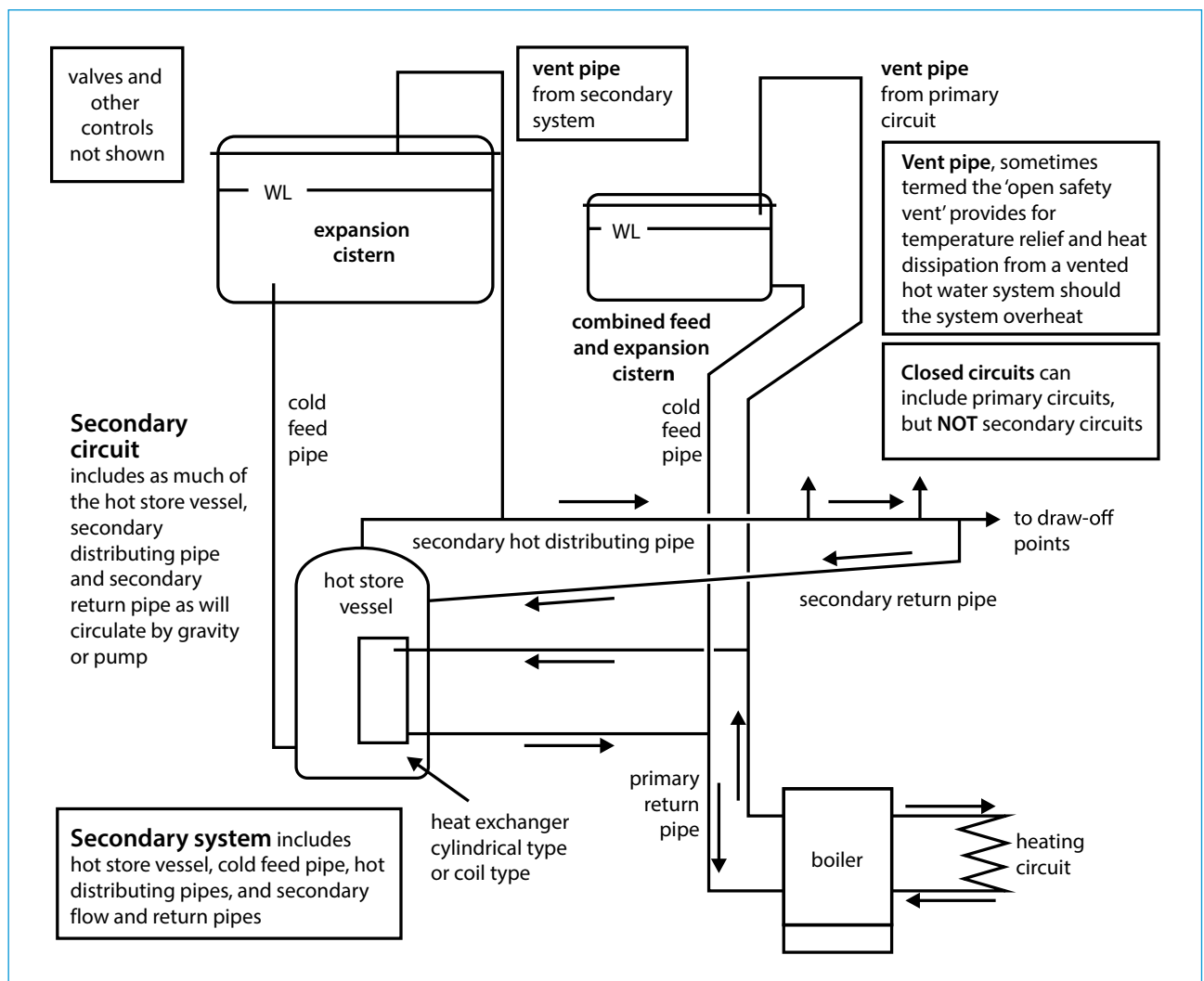
“expansion cistern” means a cistern connected to a water heating system which accommodates the increase in volume of that water in the system when the water is heated from cold;

“primary circuit” means an assembly of water fittings in which water circulates between a boiler or other source of heat and a primary heat exchanger inside a hot water storage vessel;

“secondary circuit” means an assembly of water fittings in which water circulates in supply pipes or distributing pipes to an from a hot water storage system;

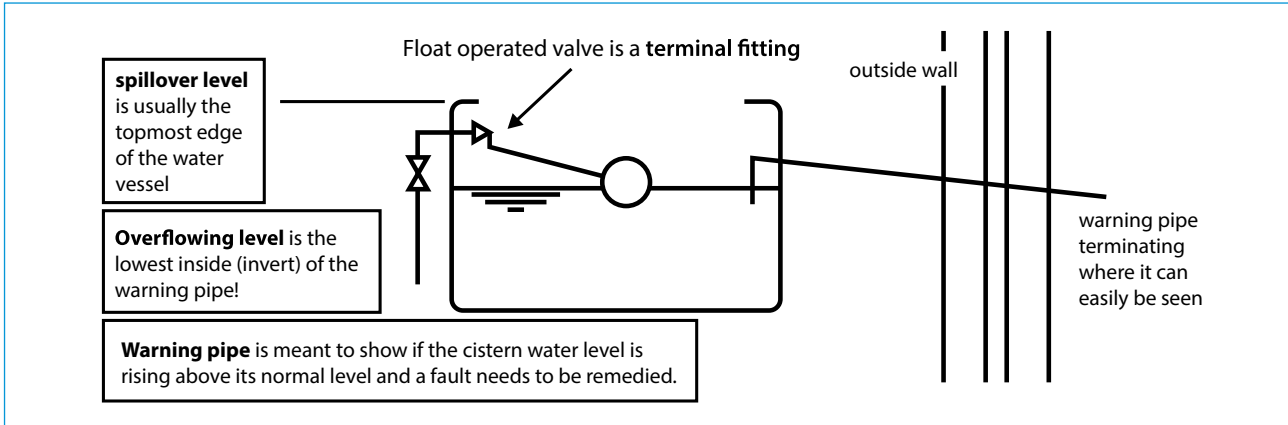
“secondary system” means that part of any hot water system comprising the cold feed pipe, any hot water storage vessel, water heater and pipework from which hot water is conveyed to all points of draw-off;

“vent pipe” means a pipe open to the atmosphere which exposes the system to atmospheric pressure at its boundary;



“overflow pipe” means a pipe from a cistern in which water flows only when the water level in the cistern exceeds its normal maximum level;

“warning pipe” means an overflow pipe whose outlet is located in a position where the discharge of water can be readily seen.

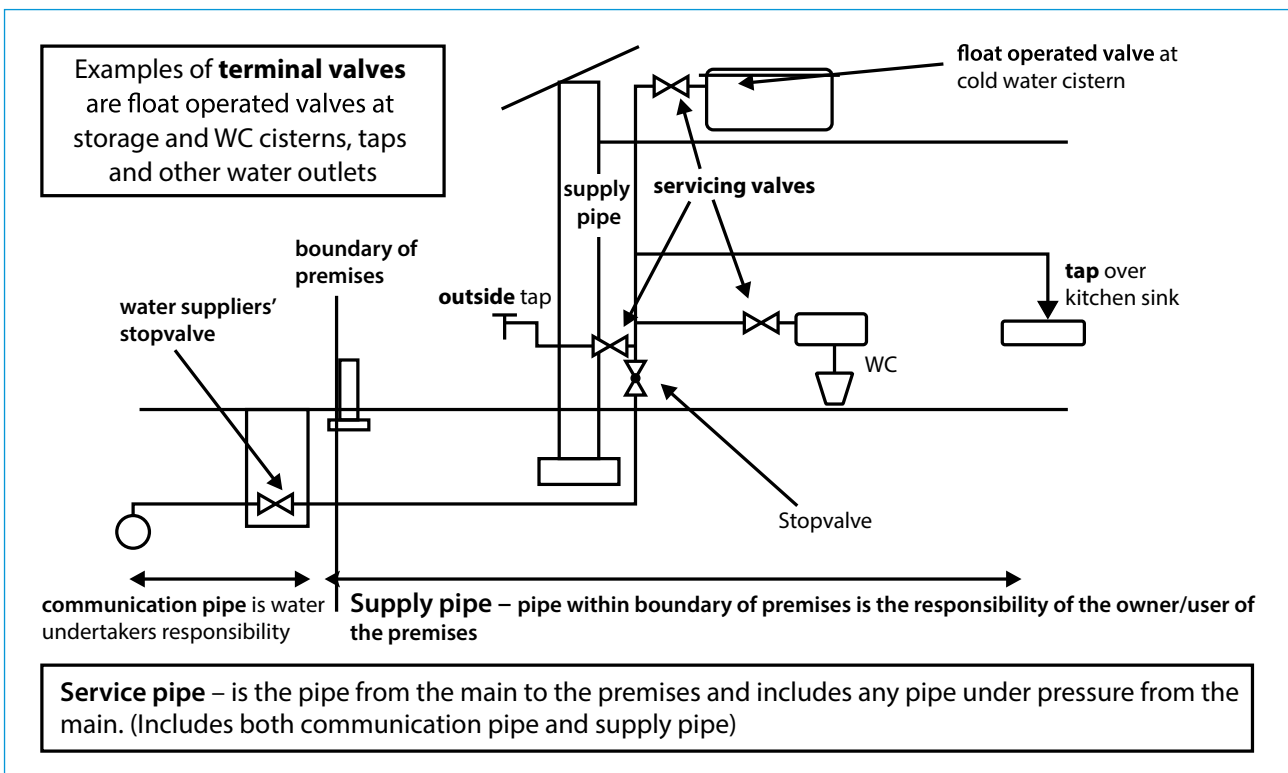


“distributing pipe” means any pipe (other than a warning, overflow or flush pipe) conveying water from a storage cistern, or from hot water apparatus supplied from a cistern and under pressure from that cistern;

“supply pipe” means so much of any service pipe as is not vested in the water undertaker;

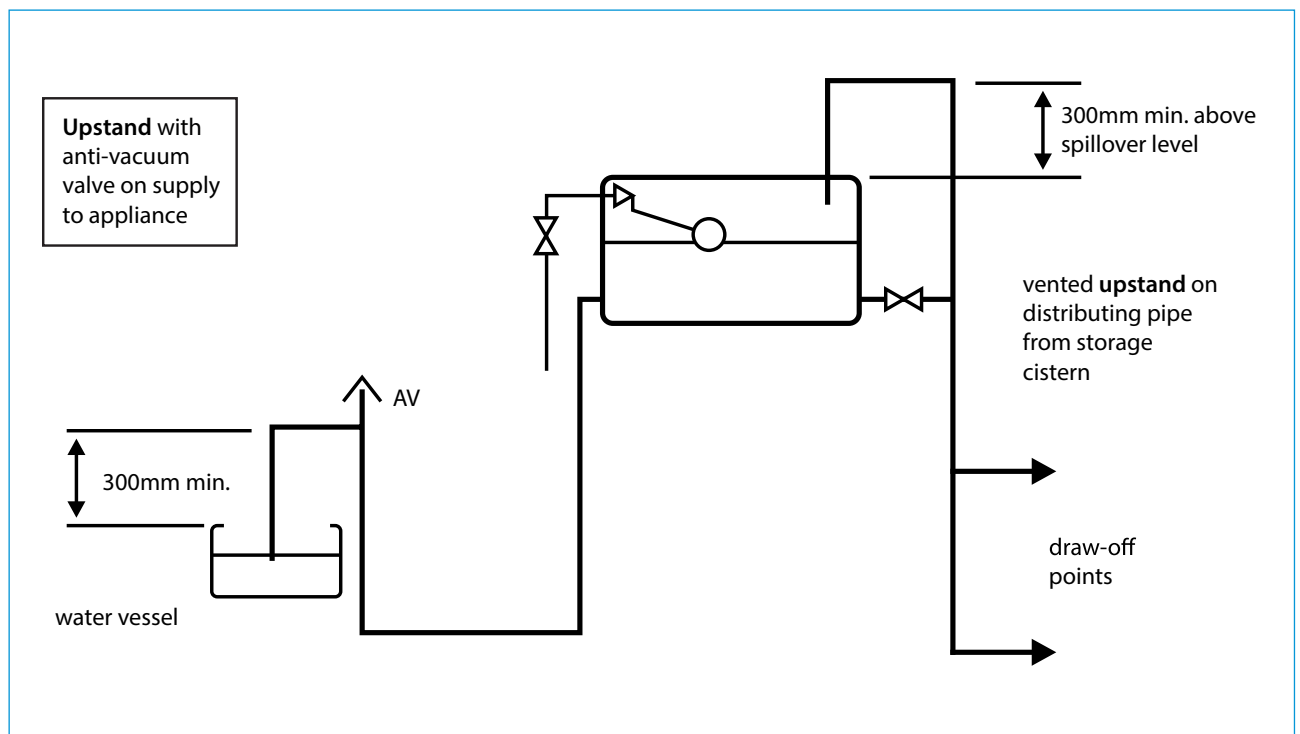
“servicing valve” means a valve for shutting off the flow of water in a pipe connected to a water fitting for the purpose of maintenance or service;

“stopvalve” means a valve, other than a servicing valve, for shutting off the flow of water in a pipe;



“upstand” means a pipe arrangement consisting of:

- (a) a branch pipe serving an appliance, where the height of connection to a supply pipe or distributing pipe is not less than a specified distance above the spillover level of an appliance, or
- (b) a pipe surmounted by an anti-vacuum valve whose outlet is located not less than a specified distance above the spill-over level of an appliance.



“concealed water fitting” means a water fitting that:

- (a) is installed below ground;
- (b) passes through or under any wall, footing or foundation;
- (c) is embedded in any wall or solid floor;
- (d) is enclosed in any chase or duct, or
- (e) is in any other position which is inaccessible or renders access difficult;

Inaccessible positions could include inside at the back of kitchen units, or roof spaces without proper means of access etc.

“surge” means a rapid increase of pressure in a pipeline;

A common cause of surge is the initial operation of a pump.

“terminal fitting” means a water outlet device.

“instantaneous water heater” means an appliance in which water is immediately heated as it passes through the heater;

“unvented hot water storage vessel” means a hot water storage vessel that is not provided with a vent pipe but is fitted with safety devices to control primary flow, prevent backflow, control working pressure and accommodate expansion;

“pressure relief valve” means a pressure-activated valve which opens automatically at a specified pressure to discharge fluid;

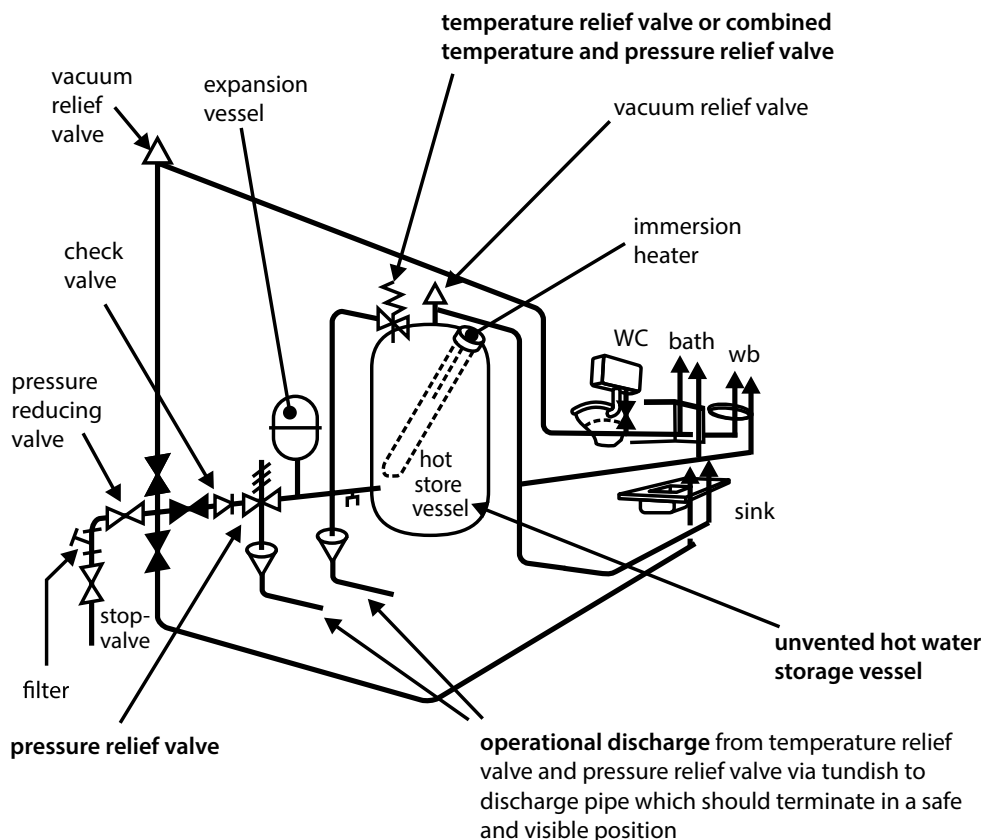
“temperature relief valve” means a valve which opens automatically at a specified temperature to discharge water;

“combined temperature and pressure relief valve” means a valve capable of performing the function of both a temperature relief valve and a pressure relief valve;

“operational discharge” means a discharge of water resulting from the operation of fittings, equipment or appliances which is necessary for their operation;

‘operational discharge’ could include the running to waste of water from an unvented hot water storage vessel where water is permitted to discharge through the operation of a temperature relief valve or a pressure (expansion) relief valve.

System using unvented hot water storage heater



Colour code identification of new water services requirements

Typical application	Basic colour identification band					Basic colour identification band
Source of water Potable designation for water meeting drinking water standards	Auxiliary Blue		Green			Water provided from the public supply (i.e. water undertaker)
	Green		Flint Grey			Water derived from a source other than the public supply (i.e. private borehole, well etc.)
End use water quality An additional black band to be applied where the end use fluid is not intended to meet standards for drinking water	Auxiliary Blue		Black	Auxiliary Blue		Public water supply system
	Green		Flint Grey	Black	Flint Grey	Green
Safety systems Fire systems connected to a drinking water mains and containing no additives, following an assessment, may be considered for potable designation	Auxiliary Blue		Red	Auxiliary Blue		Public water supply system
	Green		Flint Grey	Red	Flint Grey	Green
Non-potable designation to be applied to fire systems which, are fed from a dedicated fire storage cistern, containing additives or where there is doubt regarding the water quality	Auxiliary Blue		Black	Red	Black	Public water supply system
	Green		Flint Grey	Red	Flint Grey	Green

Colour coding key

Green 
 Black 
 Flint Grey 
 Red 
 Auxiliary Blue 

