

**A WATER SUPPLY
INDUSTRY
INSTALLATION
GUIDE**

WATER SUPPLY SYSTEMS:
PREVENTION OF
CONTAMINATION AND
WASTE OF DRINKING
WATER SUPPLIES

Agricultural Premises

*Information for
anyone installing,
modifying or
maintaining
plumbing
installations*

WRAS
Water Regulations Advisory Scheme



Prepared by the
Water Regulations Advisory Scheme
Technical Support Group

Agricultural Premises

WATER SUPPLY SYSTEMS:
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The Group wishes to express its appreciation for the support and assistance given by the farming industry in preparing this guide.

Introduction

Farmers, like all other owners or occupiers of premises with a public water supply, have a duty to comply with the Water Supply (Water Fittings) Regulations 1999 (Water Byelaws 2000 in Scotland). Equally importantly, by following these requirements, they will protect their water supplies from contamination, prevent waste of water (and avoid wasting money where supplies are paid for by means of a water meter) and ensure they have reliable and robust plumbing systems which will give good service.

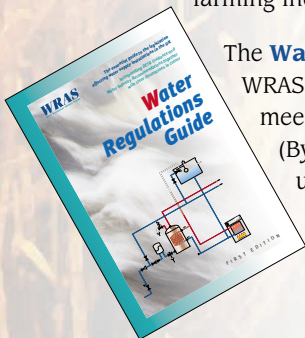
The Water Fittings Regulations (Water Byelaws 2000 in Scotland) replaced earlier water supply byelaws which water suppliers used for many years to protect water from contamination and prevent waste of water.

This installation guide has been produced with the co-operation of the farming industry and endorsed by the UK Water Industry as an aid to installing and maintaining water systems in accordance with the Water Supply (Water Fittings) Regulations 1999 (Water Byelaws 2000 in Scotland).

Scope

The main aims of this installation guide are to summarise the requirements of the regulations (Water Byelaws in Scotland) as they affect agricultural premises, for the prevention of waste of water and of contamination by backflow or cross-connection. It offers advice for farmers, whether they are considering new installations or the modification and maintenance of existing systems, on backflow prevention and on frost protection measures to prevent burst pipes and damage to fittings.

This installation guide encourages good practice, water conservation and supports efforts to establish common procedures and installation criteria for water supplies in the farming industry.



The **Water Regulations Guide**, published by WRAS provides general guidance on how to meet the requirements of the Regulations (Byelaws in Scotland). This publication, used throughout the Water Supply Industry, provides the information on which this installation guide is based.

The intention of the Regulations (Water Byelaws in Scotland) is to prevent:

Contamination, waste, misuse and undue consumption and erroneous measurement of the water supply



British Standard Specification BS 6700 1997, entitled, Design, Installation, Testing and Maintenance of Services Supplying Water for Domestic Use within Buildings and their Curtilages, is another useful and comprehensive reference document. Compliance with BS 6700 1997 will generally ensure compliance with the installation requirements of the Regulations (Byelaws).

Responsibilities

The Water Industry Act, 1991 and comparable Scottish and Northern Ireland Acts, define the responsibilities and penalties placed on Water Suppliers and on customers. They may be summarised as follows:

The Water Supplier

It is the duty of the Water Supplier to supply water which is wholesome. The Government has given the Water Suppliers the duty to enforce the Regulations (Byelaws in Scotland). Water suppliers will do this by the processes of granting of consent for proposed installations and by the inspection of new and existing premises.

Notification

The Regulations (Byelaws in Scotland) require prior notification to the Water Supplier of all new installations, certain specified items of equipment and in non-domestic premises, extensions or alterations of water systems. The Supplier has ten working days in which to refuse consent or to grant consent, with or without conditions. If no response is made after ten days, consent is deemed to have been granted and the work can start, but the installation must be carried out to fully comply with the regulations (Byelaws in Scotland).

Inspection

Water suppliers will arrange appointments to inspect new and existing premises to check for compliance of the water systems with the regulations (Byelaws in Scotland). Premises where there are higher risks of contamination will have higher priority for inspection. Many situations which are regarded as being of higher risk are commonly found on agricultural premises, but all other types of premises where there are high risks will also be included in the inspection programme.

The Customer

Legislation requires that the customer (owner or occupier):- must ensure that there is no risk of deterioration in the quality of the water from any cause whatsoever and must take responsibility for installing and maintaining fittings to ensure that water supplied is not liable to contamination, waste, misuse or undue consumption.



Causes of contamination and waste



Animal and poultry drinking troughs and bowls must be fitted with an appropriate air gap at the point of discharge and a float operated valve or some other no less effective device to control the inflow of water and prevent overflow.



Any pipe or fitting containing water that is not wholesome (eg. used mains water, rainwater, recycled water or any water not supplied by a water supplier) must not be connected to fittings or pipes containing wholesome water, unless an adequate backflow prevention device is installed.



Water supplies used for farm processes (chemical mixing etc.) should only be fed via a backflow prevention device suitable to protect against the level of risk (see pages 8 & 9). Stand-pipes for non-domestic purposes should also be supplied from a storage cistern unless written permission is obtained from the Water Supplier.



All underground pipes should be at a minimum depth of 750mm (2'6"). Pipes may only be installed at a shallower depth with the written permission of the Water Supplier and provided that they are insulated, to prevent damage – particularly from frost.

What to look for

Incorrectly installed water fittings and systems and cross-connections with other water sources can lead to the contamination of mains water supplies and installations, and can cause waste of water.



Causes of contamination and waste



Float-operated valves to BS1212 Part 2 or 3 or those that are listed by the Water Regulations Advisory Scheme are required for cisterns and they must have a servicing valve upstream of the float-operated valve



Ensure you have your own stop-valve for isolating the water supplied. Additional stop valves should also be fitted to isolate separate buildings within the farm.



No pipe or fitting, particularly a plastics pipe or fitting, may be installed in contact with contaminated material, regardless of any protection given, for example, where diesel/petrol fuel is stored, or is likely to be spilt, or near a silage silo, or near a cesspit.



Distribution water mains – ensure you are aware of the location of any water mains crossing your land.



It is prudent to make sure you know the location of the water meter and its controlling stop-tap. Also, check meter readings regularly (high readings could indicate a burst pipe or wastage).



Some useful definitions

CONTAMINATION

Contamination is where a change takes place to the quality of the water and, or, deterioration of the quality of the water supplied by the water supplier whether it be harmful to health or not.

BACKFLOW

Backflow is defined as 'flow in a direction contrary to the intended normal direction of flow'.

CROSS-CONNECTION

Any connection between wholesome water supplied by the Water Supplier and any other water.

Preventing contamination

Assessing the risk of contamination

An assessment is required of the contamination risk for each water fitting or appliance that contains water or other liquids and is connected to the plumbing system. The regulations (byelaws in Scotland) define five levels of contamination risk, called Fluid Categories, and for each category backflow prevention devices are described which provide an adequate level of protection.

The Fluid Category should be assessed on the highest level of risk to which the water fitting is exposed.

Definition of Fluid Categories

Fluid category 1	Wholesome water supplied by a water undertaker and meeting the quality requirements for drinking water.
Fluid category 2	Water in fluid category 1 whose aesthetic quality is impaired owing to: <i>a change in its temperature, or the presence of substances or organisms causing a change in its taste, odour or appearance, including water in a hot water distribution system.</i>
Fluid category 3	Fluid which represents a slight health hazard because of the concentration of substances of low toxicity, including any fluid which contains: <i>ethylene glycol, copper sulphate solution or similar chemical additives; or sodium hypochlorite (chlorox and common disinfectants).</i>
Fluid category 4	Fluid which represents a significant health hazard because of the concentration of toxic substances, including any fluid which contains: <i>chemical, carcinogenic substances; or pesticides (including insecticides and herbicides); or environmental organisms of potential health significance.</i>
Fluid category 5	Fluid representing a serious health hazard because of the concentration of pathogenic organisms, radioactive or very toxic substances, including any fluid which contains: <i>faecal material or other human waste; or butchery or other animal waste; or pathogens from any other source.</i>

Where the risks are

Some typical contamination risks with their associated Fluid Categories, are given in the following list of examples. The list is only representative and should not be regarded as exhaustive.



Note:
The Fluid Category should be assessed on the potential contaminant. For example, a fire hose reel sited where it cannot reach other contamination risks would be a Fluid Category 2 risk. If sited where the nozzle could be immersed in insecticide it would be Fluid Category 4 risk, but if it could be placed in a drain or in animal waste, it would be a Fluid Category 5 risk.

Examples of risks

EQUIPMENT AND LOCATION		FLUID CATEGORY
Hose Union Taps		
1.	Domestic gardens	3
2.	Other risk areas (see page 12)	5/4/3*
Dairy/Milking Parlours		
3.	Cleaning/sterilising equipment	5/4*
4.	Pasteurising equipment	5
5.	Milk cooling equipment	3
6.	Udder washer	5
7.	Boot washer	5/4/3*
Water Treatment Plants/Facilities		
8.	Water softeners	3/2*
9.	Battery charger de-ionizers	5/4*
10.	Water heaters	3/2*
11.	Steam raising plant	5/4/3/2*
12.	Any water not supplied by a public water supplier	5
Power/Jet Washers		
13.	Drain jetting units	5
14.	Permanently plumbed units	5
15.	Portable/mobile units	5
Chemical Mixing		
16.	Crop spray/liquid fertiliser	5/4*
17.	Sheep dips	5
Irrigation Equipment		
18.	Fixed/permanently plumbed	5/4/3*
19.	Mobile	5/4/3*
Fire protection		
20.	Standpipes connected to fire hydrants	5/4/3*
21.	Mains fed sprinkler systems without additives	2
22.	Mains fed sprinkler systems with additives	4
23.	Fire hose reels	5/4/3/2*
24.	Water storage for fire fighting purposes	5
Miscellaneous		
25.	Drinking troughs/bowls/nipple feeds	5
26.	Recycled water	5
27.	Produce washeries/packing stations	5
28.	Washing machines – domestic use	3
29.	Washing machines – non-domestic use	5/4*
30.	Showers	5/4/3/2*

* Fluid category dependent on local circumstances and to be confirmed by the Water Supplier

Typical backflow prevention arrangements and devices

Fluid category 5

For example a Type AA air gap or a Type AUK1 air gap (ie. fed from storage).

Fluid category 4

For example, a Type AF air gap or a reduced pressure zone valve (Type BA) mechanical backflow prevention device.

Fluid category 3

For example, a double check valve (Type EC or ED) mechanical backflow prevention device.

Fluid category 2

For example, a single check valve (Type EA or EB) mechanical backflow prevention device.

Note: All mechanical backflow prevention devices can fail and therefore need planned inspection and maintenance or replacement.

Irrigation Systems

FIXED HEAD

An irrigation system, without insecticide or fertiliser additives, which has sprinkler heads fixed not less than 150mm (six inches) above the ground, is assessed as a Fluid Category 3 risk. It can be protected against backflow by a double check valve or another device which provides protection to at least the Fluid Category 3 level. This applies to the use of such an irrigation system in a domestic garden or in a non-domestic location.

NON-DOMESTIC LOCATIONS

All other non-domestic irrigation systems whether with outlets at or below ground level, or using permeable (porous) pipes, and with or without chemical additives, are assessed as Fluid Category 5. As such they require backflow protection using a suitable device to provide protection to Fluid Category 5 level.

Approved fittings

Every water fitting shall be of an appropriate quality and standard and suitable for the circumstances in which it is used.

If you are unsure about the acceptability of any fitting, consult your local Water Supplier.

Backflow protection devices should be suitable for the fluid category identified and typical examples are overleaf.

A full list of air gaps and devices can be found in the DETR Guidance document and the Water Regulations Guide available from WRAS.

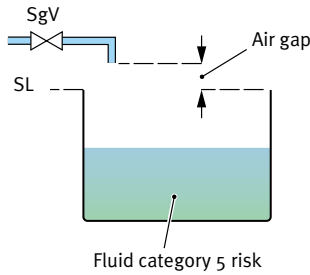


Examples of suitable fittings may be found in the WRAS Water Fittings and Materials Directory.



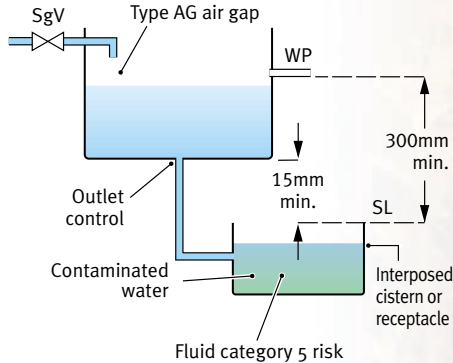
Typical Backflow Prevention Arrangements

Type AA air gap – for Fluid Category 5

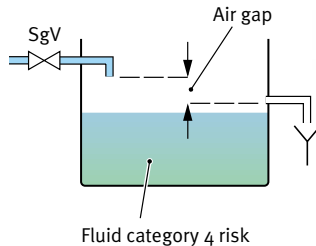


The vertical distance of the discharge point of inlet pipe above spill over level must be at least twice the bore of inlet pipe and never less than 20mm

Type AUK₁ air gap – for Fluid Category 5 (interposed cistern)



Type AF air gap – for Fluid Category 4



KEY

SgV Servicing valve

WP Warning/overflow pipe

SL Spillover level

Y Tun dish

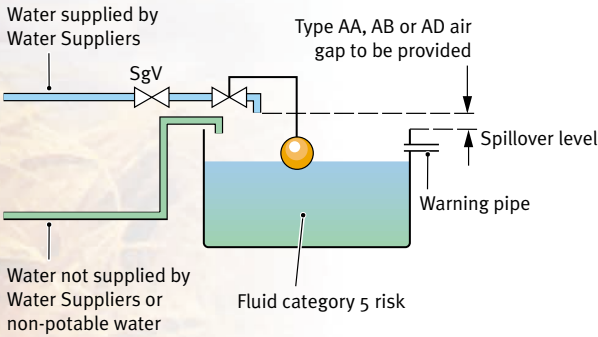
⊙ Pump

Technical Notes and Diagrams

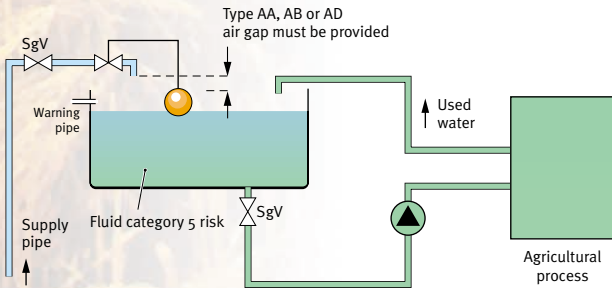
Examples of Agricultural Plumbing Layouts

1. NON-DOMESTIC SUPPLIES FOR AGRICULTURAL USE

A. Separation of mains supply from other supplies



B. Separation of water in a supply pipe from water that has been used



Technical Notes and Diagrams

2. HOSE UNION TAPS

The requirements for the installation of Hose Union connections apply whether a hose is connected or not. The level of protection is determined by the potential use and contamination risk.

Bibtap with hose union

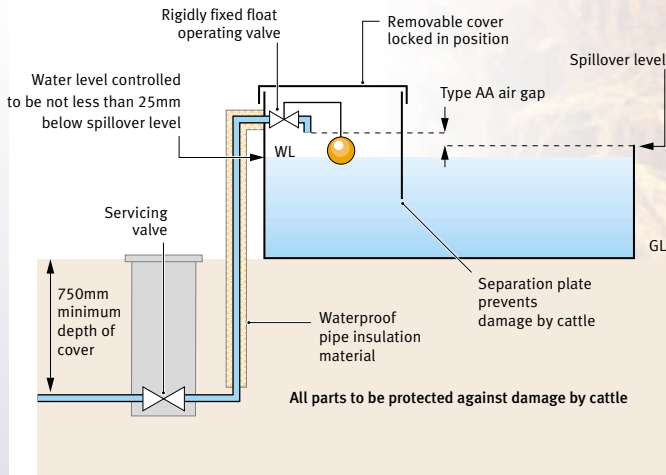
Except where fitted for use only in a domestic garden, this type must be supplied through a backflow prevention device suitable for the highest risk to which the tap might be exposed. The level of protection will be subject to confirmation by the water supplier.

For all hose union taps supplied directly from the mains, an air gap should be maintained at all times at the outlet end of the hose, i.e. if the hose is left unattended, the outlet must not be allowed to be submerged. It is also preferable to use flow control with automatic shut-off e.g. a hand held trigger device.

3. ANIMAL DRINKING TROUGHS AND BOWLS

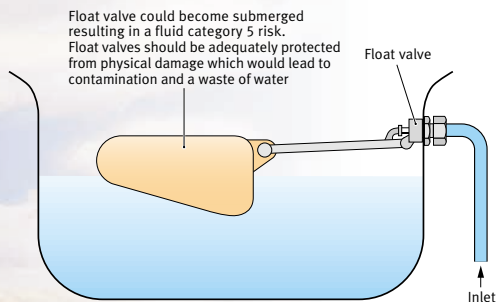
A. Cattle Drinking Trough

Note: It is important to carry out maintenance especially to float operated valves to prevent them from becoming submerged or wasting water. It is also important to provide adequate protection for above ground pipes and fittings to ensure that they are adequately insulated against frost and protected from physical damage which could cause leaks or the ingress of contamination.

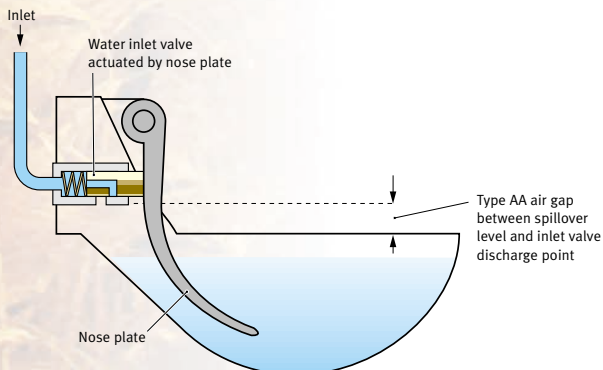


Technical Notes and Diagrams

B. Animal Drinking Bowls



This type of bowl must be supplied from a dedicated cistern or through a type AA air gap only.



This type of bowl may be supplied directly from a supply pipe.

If you want to carry out alterations to your plumbing system

- *Use approved materials and fittings only.*
- *Use a competent plumber to ensure that the work will comply with the Water Regulations (Byelaws in Scotland).*
- *You are legally obliged to tell your Water Supplier in advance of any work you intend to carry out on your plumbing system except for repairs and like-for-like replacements.*
- *Remember it is hazardous and unacceptable to connect your electrical appliances or electrical installations to your water pipes for earthing purposes. If in doubt, get your electrician to check that your installation is properly earthed.*

Points to remember

Backflow of contaminated water to drinking water taps in the farm or into the water main may be harmful to health



The Water Regulations (Byelaws) require that, except in very few circumstances, notification must be given before installing or modifying plumbing systems and installation work must not commence without the water suppliers' consent.



Buy only approved fittings. Suppliers are not required by law to sell plumbing fittings that comply with the Regulations, but both the installer and user will be responsible if fittings are used which do not comply. Be safe by insisting that your supplier confirms that fittings are of an appropriate quality and standard. See the Water Fittings and Materials Directory



The use of new lead pipe or fittings is now prohibited. The use of leaded solder on drinking water installations has been illegal for over ten years. Care should be taken to ensure that only approved solders, marked 'lead free' are used for drinking water installations.



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Pipes located in roof spaces and any other unheated space need to be insulated for frost protection. Preformed pipe insulation is available. Loose bandage type insulation will require a greater thickness. Extra insulation will be required to delay freezing by unusually prolonged low temperatures.



Pipework downstream of the Water Supplier's meter and stop-tap is the responsibility of the owner or occupier of the premises. If any pipework servicing your property is made of lead and you wish to renew it, consult your local Water Supplier.



Always use a reputable plumber. Many Water Suppliers now maintain registers of Approved Plumbers – If you undertake plumbing work yourself make sure that you know the requirements of the water regulations (Byelaws in Scotland). Ensure that the clean water supply is never connected to used water supplies.



You may wish to use equipment that requires a higher water pressure for it to operate than the incoming mains pressure. If you are planning to install a booster pump which draws more than 12 l/m you must first notify your local Water Supplier.

Where to seek further information and advice

Other Water Supply Installation Guides include:

Domestic Plumbing Systems

Railway Premises

Ports, Marinas and Harbours

Dental Practices

Holiday and Residential Parks

Photographic Premises

Water and Waste Water Treatment Works

References

Water Industry Act, 1991
Water (Scotland) Act, 1980
The Water Supply [Water Quality] Regulations 2000
Northern Ireland Water & Sewerage Order
Local Government Finance Act, 1994
Environment Act, 1995
The Water Supply (Water Fittings) Regulations 1999
The Water Byelaws 2000, Scotland.

1. The Water Regulations Guide.
2. The Water Fittings and Materials Directory

Notes: 1 and 2. Both of these are available by purchase from WRAS

Each Water Supplier will respond positively to enquiries about intended plumbing installations and the Water Regulations (Byelaws in Scotland).

The Water Regulations Advisory Scheme will also advise on specific issues.

Water Supplier

Refer to the local telephone directory in your area.

National Farmers' Union

Agriculture House,
164 Shaftsbury Avenue,
London, WC2H 8HI
Tel: 0207 331 7200
Fax: 0207 331 7312

National Farmers' Union of Wales

Llys Amaeth, Plas Gogerddan,
Aberystwyth SY23 3BT
Tel: 01970 820820
Fax: 01970 820821

National Farmers' Union of Scotland

Rural Centre, West Mains, Ingleston,
Newbridge, Midlothian EH28 8LT
Tel: 0131 472 4000
Fax: 0131 472 4010

Water UK

1 Queen Anne's Gate,
London, SW1H 9BT
Tel: 0207 344 1844
Fax: 0207 344 1866

Water Regulations Advisory Scheme

Fern Close,
Pen-y-Fan Industrial Estate,
Oakdale, Gwent,
NP11 3EH
Tel: 01495 248454
Fax: 01495 249234

(advice and publications on the water fittings regulations (Byelaws in Scotland), representing the UK water suppliers).



Further copies of this Guide may be obtained from the Water Regulations Advisory Scheme at the address given above.