

**Water Storage, Use and
Wastewater Disposal for Leisure
Boats and Caravans**

Authors: Mike Waite & Emma Oddie

An FWR Guide

FR/G0010

JULY 2016

© **Foundation for Water Research**

Price: £15.00
(20% discount for FWR Members)

Foundation for Water Research
Allen House, The Listons
Liston Road, Marlow, Bucks.
SL7 1FD, U.K.

Tel: +44 (0) 1628 891589

Fax: +44 (0) 1628 472711

E-mail: office@fwr.org.uk

Home page: www.fwr.org

Copyright

Apart from any fair dealing for the purposes of research or private study, or criticism or review, as permitted under the UK Copyright, Designs and Patents Act (1998), no part of this publication may be reproduced, stored or transmitted in any form or by any means, without the prior permission in writing of FWR.

Disclaimer

Whilst every effort has been made to ensure accuracy FWR (and its contractors) will not accept responsibility for any loss or damage suffered by any person acting or refraining from acting upon any material contained in this publication.

Appropriate professional advice should be sought when making important decisions to ensure the information is correct, up-to-date and applicable to specific circumstances.

Water Storage, Use and Wastewater Disposal for Leisure Boats and Caravans



Front cover image - *Camping site on a lake with caravans and boats*
© joyfull/Shutterstock.com

Authors: Mike Waite & Emma Oddie

Contents

GENERAL INTRODUCTION	1
A. Potable Water	2
A1 Introduction.....	2
A2 Obtaining potable water.....	2
A2.1 Caravans	3
A2.2 Boats.....	5
A3 Getting water into the caravan or boat.....	5
A4 Managing water within the boat or caravan	6
A5 Heating and Hot Water	7
A6 Treatment and Disinfection of water, water systems, and fittings	8
A6.1 Disinfectants.....	8
A6.2 System drainage	9
A6.3 System disinfection	9
A7 Annex – The Regulatory Framework	10
B. Wastewater disposal	10
B1. Introduction.....	11
B2. What is wastewater and how is it created?	11
B2.1 Understanding the different types of wastewater	11
B3. Collection and disposal of wastewater on boats	12
B3.1 Rules for disposal of wastewater	13
B3.2 Boat toilets.....	14
B4. Collection and disposal of wastewater in caravans.....	20
B4.1 Rules for disposal of wastewater from caravans	20
B4.2 Storage and disposal of blackwater from caravans	21
B4.3 Chemical toilet maintenance	24
B4.4 Storage and disposal of greywater from caravans	25
B5. Appendix.....	26
B5.1 Blackwater disposal rules for large vessels at sea	27
C. References	28
C1 Section A references	28
C2 Section B references	29
D. Additional Useful Sources and Links	32

GENERAL INTRODUCTION

This Guide provides a comprehensive overview of the safe storage and use of drinking water, and disposal of wastewater, for owners of leisure boats and caravans. With reference to the latest guidelines and regulations, this guide aims to bring all of the relevant information together in one easily accessible document.

There are a number of diseases which can be spread by water and whilst outbreaks of diseases such as cholera and typhoid no longer occur in the UK, thanks to the quality of our treatment and distribution methods for drinking water, and our robust sewage treatment framework, they remain an ever-present threat in other parts of the world. Instances of other diseases spread by drinking water still occur very occasionally in the UK when the barriers to their spread break down. Wherever water is stored or wastewater created there is a risk of infection that needs to be managed. Good hygiene is therefore essential when treating, distributing and using drinking water and in handling and disposing of wastewater. Since contaminated water can transmit infection not only when drunk but also when used for cleaning teeth or washing food such as salad (which is eaten without cooking), the term used in this report, and more generally for water used for these purposes is, *potable water*. Recreational use of water can also lead to infections, although this is outside the scope of this Guide (for further reading on this topic see FWR Guide [FR/G0005](#) 'Standards for Recreational Water Quality').

Clean and safe water therefore remains a keystone for public health protection. Following the guidance in this report will help ensure that leisure boat and caravan users meet their obligations to preserve clean water for everyone.

This Guide is not intended as a practical manual and does not address issues relating to the mechanics of water supply systems such as pumps, switches etc. except where this is relevant to water quality.

The advice is based around the use of leisure boats and caravans in the United Kingdom for personal use and therefore does not cover the use of commercial vehicles. Much of the content may nevertheless be relevant further afield and for larger vehicles. When the term caravans is used it also includes motorhomes when appropriate.

Section A of this report addresses the collection, storage and use of potable water while section B covers the collection, storage and disposal of wastewater.

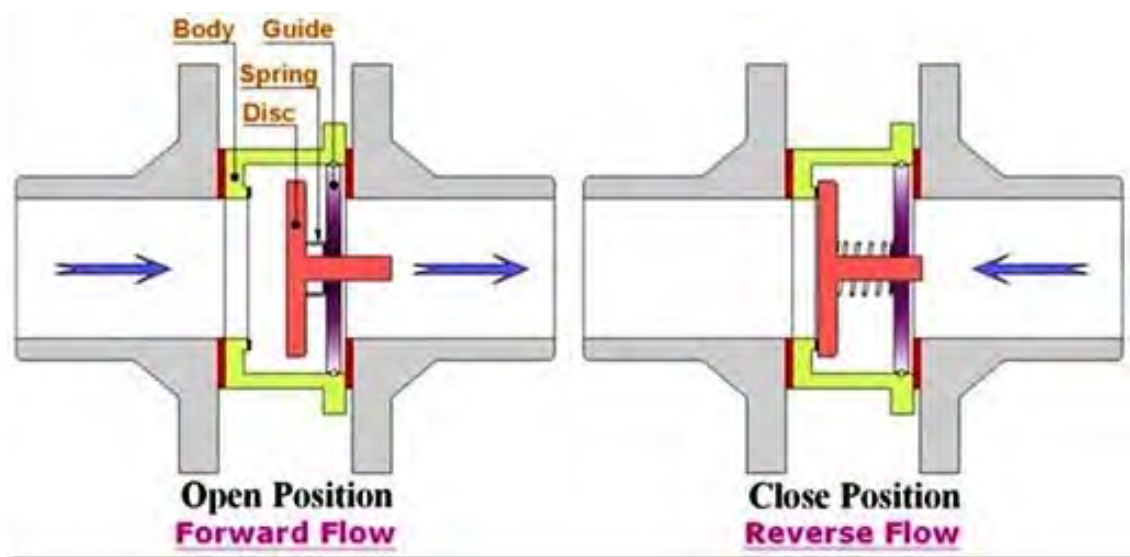
It must be emphasised that this guide does not endorse the use of particular makes or models of equipment, but does show various pictures of brands for illustrative purposes only.

A. Potable Water

A1 Introduction

In households in the United Kingdom safe potable water can almost always be taken for granted thanks to a robust regulatory regime based on the EC Directive 98/83/EC on the quality of water intended for human consumption (a1) Details of the Regulatory Framework are given in the Annex at the end of this section. In the interest of brevity from this point general **references in this Guide to Regulations should be taken to mean any or all of the Regulations for England and Wales, Northern Ireland and Scotland** as appropriate, all of which are essentially similar in content

Even though supplies should be from a source of high quality it is essential that the quality is maintained right to the point of use, be it a tap or shower, and this requires care to be taken when collecting the water and its proper safe handling within the boat or caravan. It is also essential to ensure that water from the caravan or boat cannot transfer back into the supply main. This when it occurs is referred to as “backsiphonage” or “backflow”. To guard against this a device variously called a check valve, non-return valve or backflow preventer is required and there are a number of different designs, this being a typical example. A backflow preventer is often incorporated within the tap itself.



Disc Check Valve

Image from piping-info.blogspot

A2 Obtaining potable water

There are some activities for which potable water may not be required, in particular for the flushing of toilets, but for most purposes a supply of clean and wholesome water is essential. Water supplied directly by a Water Company will usually contain a low level of chlorine, usually up to a maximum of c.0.5 mg/l but this will dissipate over time and especially if there is water storage on the site. There are somewhat differing considerations with boats and caravans.

A2.1 Caravans

In the case of a static caravan there is normally a permanent connection to a mains water supply and no special precautions need to be taken other than those necessary to maintain quality within the caravan, although a pressure reducing valve may be needed if the pressure in the main is too high. However, there should always be an effective backflow preventer to prevent water from the caravan returning into the supply main.

In a conventional house cold water taps are fed either directly from the supply main or from a storage cistern high in the property to give pressure to taps, with a ball valve which breaks pressure, or via an unvented system which incorporates a pressure reducer and backflow preventer. Caravans do not normally have the height necessary to provide a pressure head to taps so it is usual for any water storage tanks to be below the caravan floor with some means of raising the water to serve taps and showers (see section A4.0 below). All materials in any caravan which takes water directly from a water main must comply with the Water Supply (Water Fittings) Regulations 1999 [\(a2\)](#), in Northern Ireland with the The Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 [\(a3\)](#) or the Scottish Byelaws [\(a4\)](#). The Water Regulations Advisory Scheme (WRAS) [\(a5\)](#) provides a useful account of these Regulations [\(a6\)](#) the purpose of which is to prevent waste, contamination, misuse or undue consumption of water. To avoid contamination, it is best to have proper plumbing using only materials approved under the Water Regulations Advisory Scheme (WRAS), and a backflow preventer to stop any water from the caravan backflowing into the supply main.

In addition to operating an approvals service for materials in contact with water, WRAS produces a wealth of useful advice and guidance on situations and activities which may have the potential to cause waste or contamination of water supplies and this guide includes a number of references to WRAS publications. Even when there is no direct connection with the mains supply it is sensible still to use only WRAS-approved materials as non-approved materials may support bacterial growth and cause taste or odour in the water.

If the individual caravan owner were directly billed by a Water Company then the Company would be responsible for the supply up to the boundary stop-tap for the pitch, but usually the site owner provides the supply, meters the individual caravan's usage, and charges the caravan owner. The distribution system within the site is then the site owner's responsibility. On many caravan sites there will be hook up points for individual mobile caravans and providing the connectors are kept clean, and disinfected if necessary, the considerations for static caravans remain appropriate. However it is important to be sure that the mains water serving the connection point is either directly from a public water main or a recognised regulated private supply. If the site distributes water derived from a public water distribution system after passage through any storage tank of its own then in terms of the Regulations that water becomes a private supply. If in any doubt then it is reasonable to ask the site owner where the water supply comes from, and it may be wise to disinfect the water before using it (see section A6.0 below).

In the absence of facilities for direct connection to a water supply it may be necessary to manually transport water from a collection point.



photo courtesy of Andrew Jenkinson

In the simplest case water may be collected from a suitable tap in clean bottles or other closeable containers kept solely for the purpose, for safety plastic is preferred, and carried to the caravan. In the most basic of caravans such a bottle with a tap may be the only water supply. Since a general recommendation from the Caravan Club for a minimum daily supply in a caravan is around 23 litres [\(a7\)](#) this may well prove onerous and a rolling barrel type transporter is preferable.



photos courtesy of F L Hitchman

It may not always be possible to position the bottle or barrel directly under the tap and a length of WRAS approved hose may be required. It is a good idea to keep a suitable clean length of hose in the caravan with either a quick-connect or a push-over tap connector or preferably both. If hose is already fitted to the tap then its cleanliness should be checked, in particular that it is

not, and has not been, in contact with the ground. No matter how hygienically scrupulous the individual caravanner might be, it cannot be assumed that all others are. If in any doubt the collected water can be disinfected before use (see Section A6.0 below) or alternatively many caravanners prefer to use commercial bottled water for drinking, teeth cleaning, and washing of any food to be eaten without cooking. In any event it is good practice to ensure that any vessel used for transporting water is kept clean and is disinfected from time to time especially if it has stood for a few weeks with water in it. WRAS has published a very useful guide on Holiday and Residential Parks ([a8](#)).

A2.2 Boats

The points made above regarding static caravans apply equally to permanently moored houseboats.

Although the most basic boat might rely on water brought on board in a bottle, leisure boats almost invariably have an on-board water tank of some description. Since the boat cannot usually be brought under the tap, water is collected from a waterside tap via a hose to a filler pipe set into the deck. The filler pipe should have a watertight cap fitted when not taking on water. Hygiene is of paramount importance when taking on water and as the hose is often quite long it may become contaminated from contact with the ground. This is particularly significant where hire craft use the hose as users may not be as aware of hygiene requirements or as responsible as regular boaters and therefore less careful. It is recommended that hoses should be the lay flat type and kept rolled up when not being used. The most secure way of providing supply to boats is via a tank or cistern with a ballcock or similar device serving to provide a break between the public mains and the outlet hose. As with caravanners many boaters prefer to use commercial bottled water for drinking, teeth cleaning, and washing of any food to be eaten without cooking. WRAS has also published a very useful guide on Plumbing Systems for the Supply of Water for Domestic Purposes to Boats in Marinas ([a9](#)).

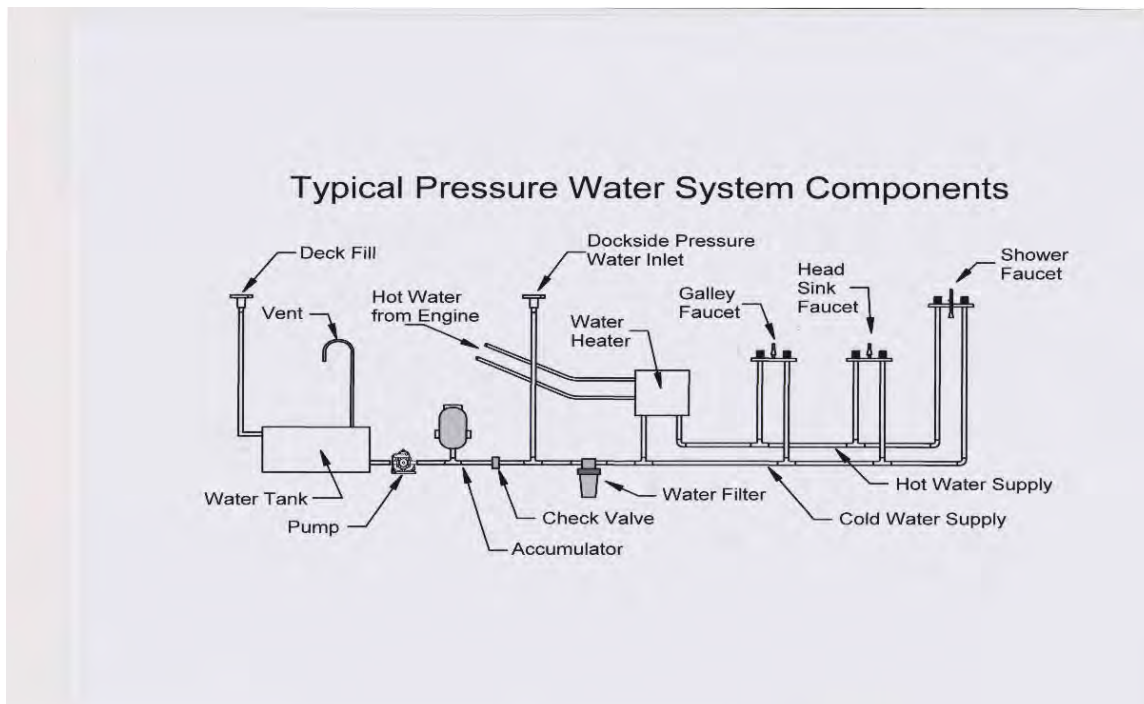
A3 Getting water into the caravan or boat

Most modern caravans will have an external water connection point to which a submersible pump placed in the water transporter can be attached. With older submersible pumps it is essential to shake the pump under the water to remove airlocks before switching it on. Such an installation can be set up to draw water only whenever a tap or other plumbed in device requires water. In such cases it is usual to have an activated carbon filter incorporated somewhere in the filling line, either before or within the connection point. Such filters require regular replacement, perhaps as frequently as monthly. Some caravans, and most motorhomes, have an on-board diaphragm pump rather than a submersible pump. This then sucks the water up from the container into the caravan. Many caravans will have an on-board water storage tank in which case there will generally be an external quick-connect fitting, with a non-return valve preventing backflow, to which the supply hose can be directly connected. However all taps used for supplying water directly into boats or caravans should incorporate a backflow preventer and not rely on backflow prevention within the caravan.

All but the most basic of boats will have some form of water storage tank on board and in many narrow boats the tank is built into the hull. Any tank needs some form of vent and any vent pipe should be fitted with suitable screening to prevent insects and foreign bodies getting in. When an on-board tank is fitted the stability of the caravan can be affected when towing and tanks should be either completely full or virtually empty when towing.

A4 Managing water within the boat or caravan

While plumbing systems in boats and caravans may have various degrees of complexity a typical layout will have most or all of the components shown in this schematic except for the hot water link to the engine which does not generally apply to caravans, although systems are available for engine-heated hot water in motorhomes.



Courtesy of Captain Pauley's Virtual Boatyard

Heating and hot water are considered later in this guide (see Section A5.0).

Any storage tank is invariably lower than any taps on board and some form of pumping is required.. In a basic setup a foot or hand operated pump can be used to deliver water when required, examples of which are shown here, but an electric pump is much to be preferred.



photos courtesy of Whale Pumps

When an electric pump is installed it is usual to have a pressure accumulator after the electric pump to maintain pressure in the system so that the water can be delivered without the need for the pump to operate every time water is drawn.

While there is no reason why the water in a boat or caravan should not be safe and pleasant to drink if properly managed, many boat and caravan users say on various websites and forums that they do not drink water on board directly and many of them cite taste as being the prime reason [\(a10\)](#). Many of those who do drink the water use a jug filter first which they find improves the taste. Provided the water comes from a satisfactory source and is hygienically handled when collected then it should be capable of being kept safe and palatable. However, it is inevitable that the water in a caravan will be at the ambient temperature and on hot days may be very warm, which affects its palatability. This may be less of a problem with a boat as the hull will be close to the temperature of the water the boat is on and this may serve to keep the boat water tank contents relatively cool. When hot and cold water pipes run close together, which is bad practice, the cold water can become very warm and while the cold water can be run until warm water is cleared from the pipe this is wasteful and particularly onerous when water has to be carried to the caravan. When the water temperature is a problem, water for drinking can always be kept in a covered jug in a refrigerator.

Despite many people's misconceptions water is not inert or inhospitable and can support microbial growth, and deteriorate over time. It is essential that water systems therefore have a reasonable turnover and water does not remain static in pipework for very long periods. It isn't possible to specify what is a very long period as this is affected by many factors including temperature and the nature of the water itself, but the best advice is "if in doubt, flush it out". Provided all materials in contact with the water are WRAS approved then they should not support microbial growth nor leach out any material causing taste or odour. It may nevertheless still be possible for algae to grow in clear plastic tubing exposed to daylight even if WRAS approved. DIY is often a source of problems and it is far from uncommon to find that non-approved materials have been used, in particular flexible pipe which has the potential to build up visible heavy deposits of what is known as biofilm, which is a mixed growth of bacteria, mould and other microorganisms. Although this biofilm may not be directly harmful it can produce not only unpleasant tastes and odours but may even break off and be seen as bits in the water. Another potential DIY related problem comes from the use of non-WRAS approved jointing compound in compression fittings. Potable water pipework in boats must be kept well away from bilges and particular care is needed to ensure that plastic pipes do not come into contact with oil. Oil can permeate plastic pipes and cause taste and odour problems.

It is good practice when the boat or caravan has stood for a while to run water through the system to remove old standing water. If the caravan or boat is not to be used for a long period it is also good practice to drain the system, especially for winter when freezing within pipes can cause damage to the plumbing. WRAS provides comprehensive advice on draining down caravans [\(a11\)](#). Before recharging the system it is an ideal opportunity to carry out disinfection, and descaling if necessary (see Section A6.0).

A5 Heating and Hot Water

Caravans and boats may be heated by hot air blowers, oil-filled radiators, fan heaters, gas or electric fires, paraffin heaters, or radiators filled with a water/antifreeze mixture. Boats, in particular traditional narrow boats, may have a solid fuel stove, or less often a diesel-burning stove. The installation requirements for a stove in a boat are very detailed, and well set out by the Solid Fuel Technology Institute [\(a12\)](#). It is also possible but not common to have a solid

fuel stove in a caravan. These all have advantages and disadvantages but space heating is outside the scope of this guide.

However some form of hot water is essential in a caravan. The most basic hot water provision is water heated directly in a kettle or pan on a gas or electric stove or on top of a solid fuel stove. This may well be sufficient for short trips, and showers are often available on caravan sites, boatyards and marinas. Gas and electric instantaneous water heaters are often installed at the galley sink to provide hot water on demand and may be sufficient for all requirements in a caravan or boat without a shower or bath.

The schematic diagram in Section A 4.0 above shows a conventional system with a hot water tank or cylinder which serves taps and showers within the caravan or boat. The water in the cylinder can be heated from the engine on a boat, or by a gas-fired heater, electric heater or immersion heater. Some electric heaters have an integral water tank providing a reservoir of hot water. A solid fuel or diesel stove in a narrowboat may have a backboiler providing hot water and even heating radiators but this is relatively uncommon.

When an electric hook-up is available then electrical hot water provision is quick and efficient but in the absence of such a hook-up then gas-fired systems and solid fuel or diesel stoves have a distinct advantage. With any form of heat generated by combustion it is imperative that ventilation is sufficient as carbon monoxide can be produced when combustion is incomplete. Carbon monoxide does not smell and can cause drowsiness followed by sleep and ultimately death. A suitable carbon monoxide detector alarm is an essential.

A6 Treatment and disinfection of water, water systems, and fittings

Recognising the vulnerability of water between the original source and the tap on the boat or caravan there are a number of additional treatments commercially available. These range from carbon filters, which may remove tastes, uv treatment units which can kill bacteria and other microorganisms, to Reverse Osmosis units which remove not only microorganisms but also dissolved salts giving a softened water. There are even commercially available units which will fully treat water on board the boat or caravan to such a degree that they can be used to treat water direct from the river or canal. Mostly these intensive treatments are relatively expensive and of most value in sea-going boats where access to fresh water is not always nearby. It is not within the remit of this guide to give any commercial endorsement but further manufacturers' information is readily available online.

A6.1 Disinfectants

There may be situations in which it is considered necessary to carry out disinfection at any stage between the source of supply to the taps or showers in the boat or caravan. Although it is usual to refer to chlorine, chlorine as such is a highly toxic gas which was used in the First World War as a weapon. When dissolved in water it forms hypochlorite which is the actual disinfectant species. In this guide the term chlorine will be used as in common parlance rather than hypochlorite. For disinfection of boat and caravan water systems chlorine is the disinfectant of choice. The use of metabisulphite or Camden tablets is to be avoided as these are mainly used to remove chlorine, not to disinfect. Suggestions that vinegar can be used are misguided as it has very little disinfecting ability and strong taste which will be difficult to remove. Some people confuse treatments to descale systems with disinfection but the two are very different, although there are dual-purpose products available which will do both. While most household bleaches are chlorine solutions they may contain other additives making them inappropriate for use in drinking water systems. Only chlorine solutions marketed for sterilising babies feeding bottles or products sold specifically for disinfecting water systems

should be used. There is also available a range of suitable chlorine tablets. When disinfecting taps, hose ends or other surfaces they should first be physically cleaned before using a chlorine solution of 1000 milligrams per litre (mg/l) (also often referred to as parts per million or ppm) but remember to check the manufacturer's instructions regarding strengths. 1000 mg/l is equivalent to 0.1% A liquid chlorine solution will not be 100% chlorine and when sold for babies bottle disinfection is likely to be as little as 2% only. Many of the sterilising tablets available are intended to give 1000 mg/l when one tablet is dissolved in one litre of water. Care must be taken when handling these solutions as they can be irritant. Once a chlorine solution is made up it should be used as soon as possible and certainly within 24 hours since the active ingredient hypochlorite decomposes quite quickly to leave common salt which has no significant disinfectant properties.

A6.2 System drainage

In order to disinfect the whole of the plumbing system it is necessary to drain it down, opening all taps and showers to allow air in and facilitate drainage. Any filters need to be removed and replaced with a suitable length of hose, or have the cartridge removed. It should be noted that if there is a diaphragm pump in the system water cannot pass back through the pump so the pump must be run until the system is empty and no water comes from any tap.

A6.3 System disinfection

The system should then be recharged with a solution of 50mg/l chlorine, taps and showers being left open until chlorine solution is coming out, when they should be shut off. The chlorine can either be added to the on-board water tank if it is accessible and its volume is known, or added to the rolling barrel when connected to the caravan. When the system is charged throughout with the chlorine solution it should be left for at least 8 hours, preferably one day, before the system is flushed out with fresh water until no chlorine is noticeable at any outlet. Any filters should be replaced. However care must be taken if there is a water heater in the system which may contain metallic parts to which chlorine can be corrosive. The heater manufacturer's instructions should always be followed. Also flexible tanks made with polyurethane may be liable to degradation when in contact with strong chlorine solutions. Some websites advocate not opening any hot taps and disinfecting only the cold water side of the system but there can be health risks associated with hot water systems. In particular the bacteria causing Legionnaires disease can grow in warm water with little or no flow such as may be found in shower heads used infrequently. The advice given by the Health and Safety Executive is relevant to water in boats and caravans.[\(a13\)](#). There are dual-purpose cleaning and disinfecting products marketed for boats and caravans which claim to both clean and disinfect water systems while not being corrosive.

Containers used for transporting water should be kept externally clean as far as possible and it is good practice to clean and disinfect the interior from time to time. The container should be rinsed out with potable water then completely filled with a 50mg/l chlorine solution and left for at least 15 minutes since disinfection is not instantaneous. The container should then be emptied into a suitable drainage point, not poured into the river, ditch or on the ground. It should then be well rinsed with potable water and if possible left upside down for several hours to drain. This is best done within the caravan and care must be taken that the container opening does not get recontaminated. Left outside to drain, the container is vulnerable to contact with the ground, passing dogs and even the ingress of a variety of animal life. More detailed advice and information is provided in the Caravan Club leaflet Water Matters [\(a7\)](#).

A7 Annex – The Regulatory Framework

The standards set out in the Directive are based on advice from the World Health Organisation through their “Guidelines for Drinking Water Quality”, which are regularly updated to take account of new knowledge. EC Directives are mandatory but only in themselves legally binding once transposed in their entirety into law by the individual member states. In the UK this is done by the making of Regulations by the appropriate Government Department. Member states can and do introduce additional national standards and requirements. Because of the legal framework in the UK, the transposition process has necessitated the making of separate Regulations for England and Wales, Scotland and Northern Ireland and a number of additions and amendments have been made since the first Regulations for England and Wales were made in 2000. The Drinking Water Inspectorate for England and Wales has produced an unofficial consolidation of its Regulations (a14). While public water supplies in England and Wales are the responsibility of commercial Water Companies, in Northern Ireland and Scotland they are operated by publicly owned companies. For this and other reasons Northern Ireland (a15) Scotland (a16) and Wales (a17) have their own Regulations although all the various Regulations give full effect to the EC Directive. All the Regulations require water suppliers to undertake regular monitoring of their supplies and to make results freely available to the public, and the various Inspectorates oversee the results and investigate any failure to meet the required standards or other regulatory requirements. In the interest of brevity from this point **references in this Guide to Regulations should be taken to mean any or all of the Regulations for England and Wales, Northern Ireland and Scotland** as appropriate, all of which are essentially similar in content. One aspect of the regulation of water supplies is regular monitoring but most monitoring cannot be continuous and of necessity there may be quite a long time between samples, with the possibility of there being a significant time between a deterioration in water quality and its detection by monitoring. In the worst case this could allow consumers’ health to be impacted. ‘The World Health Organisation Guidelines’ (a18) advice on drinking water is that the most effective way of consistently ensuring the safety of a drinking water supply is through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer. Although monitoring has an important role and remains a requirement, since 2007 water companies in England and Wales have also been required to produce Water Safety Plans which identify and assess any risks to the quality of their supplies. A similar requirement applies in Scotland and Northern Ireland.

However, in addition to public water supplies there are a number of so-called private supplies and these also must meet the standards set in the Directive although they are subject to separate regulations from public supplies (a19). About 1% of households in England and Wales are not directly supplied off a public water main, rather fewer in Northern Ireland, and some 150,000 people in Scotland. These supplies must also be monitored and in England and Wales, and also in Scotland, this is the responsibility of the relevant Local Authority which must also maintain records and provide details on request. The results for supplies in England and Wales are also required to be audited by the Drinking Water Inspectorate while the Northern Ireland Drinking Water Inspectorate with the assistance of Local Authorities oversees Private Supplies. Just as with public supplies it is a primary requirement in all the various regulations that a risk assessment be carried out on all private supplies supplying more than a single property. It is expected that Water Safety Plans will be required by the next revision of the EC Directive. Caravan sites on farms and in remote areas may well be served by private supplies and it might be prudent to ascertain the status of the water supply before using it for drinking, washing salads etc. or teeth cleaning. *It is important to recognise that water supplies in other countries may not always be safe and wholesome and may require additional treatment by the caravan or boat user.*

Any changes in UK legislation following leaving the EU are unlikely to become clarified for a number of years.

B. Wastewater disposal

B1. Introduction

This section of the guide addresses the collection, storage and disposal of wastewater for leisure boats and caravans. The advice is focussed on the use of smaller leisure boats (with on board capacity of 15 passengers or less for seafaring vessels, 12 passengers or less for inland water vessels) and for standard sized motorhomes and touring caravans (8-berth or less).

The definitions of the different types of wastewater are included and the regulations regarding the storage and disposal are explained in detail. Further information can be found on most of the topics in the reference section.

B2 What is wastewater and how is it created?

Wastewater isn't a topic that needs to concern most homeowners in the UK, unless you are disconnected from the mains sewage system. In most residential properties, municipal sewage treatment works receive all toilet flush water, sink, shower, bath and appliance water, treating, cleaning and disposing of all water based waste.

But as soon as you are disconnected from the mains system, wastewater becomes a topic that requires attention and understanding. Whether you are touring in a mobile caravan or engaging in leisure boating, wastewater may have ramifications on your personal safety and enjoyment, as well as that of your fellow leisure users. And of course safe wastewater disposal is crucial for preserving the surrounding delicate environmental areas.

B2.1 Understanding the different types of wastewater

There are two key types of water generated through domestic activity: greywater and blackwater. Each type varies in the risk that it poses to health and the environment, and each must be dealt with in a different way because of this.

B2.1.1 Greywater

Greywater is typically the water produced as a result of washing or cleaning and as such contains no human waste. Greywater is generated by the following:

- Sinks
- Showers
- Dishwashers
- Washing machines
- Wash down activities

Greywater has a low health risk factor, due to the type and volume of bacteria and other microbes that it might contain. However, due to the chemicals used in washing and cleaning, greywater may still have an impact on the local environment.

In the case of wastewater on boats, bilge water is considered as greywater, but requires a special mention due to the oil and other contaminants that it may contain (more information on this is included in the boat section).

B2.1.2 Blackwater

Blackwater is essentially the sewage created by toilets. It contains urine and faecal matter and therefore the cocktail of bacteria and viruses that are present as a general functioning of the

human digestive system, as well as other pathogens present as a result of illness. Due to the risk of infection, blackwater needs to be collected and treated, or disposed of, responsibly.

Why does blackwater need to be treated?

Wastewater that contains blackwater needs to be treated before it can be discharged to inland waterways (there are other rules for boat owners on the high seas and this will be discussed in more detail later).

Sewage treatment includes the use of aerobic bacteria (requiring oxygen), naturally present in the waste, to break down disease causing bacteria and organic matter to acceptable levels. The bacteria also work to process nitrogen and break down the solids particles present in the wastewater. The resulting liquid has a lower biological oxygen demand, meaning that it won't accelerate bacterial growth in rivers and lakes (which in turn might remove a source of oxygen for native species of plants and animals). A lower nitrogen content will prevent excessive algal blooms which work to block light from rivers and further decrease oxygen levels, which in turn may lead to the death of fish and other native fauna.

Although aerobic bacteria are already naturally present in wastewater, they require optimal conditions in order to effectively treat the sewage. The process may start in storage tanks, but the conditions are usually not optimised to allow treatment to acceptable levels, therefore wastewater must be more fully treated in order to achieve this.

The Government have issued recent new guidance on sewage treatment in relation to those homeowners who aren't connected to the main sewage network ([b1](#)), and although this might be of interest to some static caravan users, this guide will look at the lesser documented area of mobile systems.

Read on for information on how to safely collect, store, dispose of, or treat wastewater, both grey and black.

For the most part, the key consideration for both boat and caravan owners will be the collection and eventual disposal of wastewater; however since the systems used, the rules that apply and facilities for disposal vary between the two applications, boats and caravans will be discussed in different sections.

B3. Collection and disposal of wastewater on boats

The different types of wastewater have been considered earlier in the guide, this section addresses the importance of storage and disposal, specifically in connection with boats.

Essentially any wastewater produced on a boat will be either greywater (from sinks, showers, dishwashers, washing machines, wash down and bilge water) or blackwater (from toilets). The way in which this wastewater is processed will depend on the number of people on board the vessel, the waters in which you are travelling and the type of water that is being produced, as well the quantity of disposal options available in each water environment.

The advice given in this guide applies only to UK waters, if you are travelling into foreign waters it makes sense to check the regulations for that particular country before you travel. The RYA website provides an overview for many European countries on the use of holding tanks ([b2](#)).

B3.1 Rules for disposal of wastewater

B3.1.1 Blackwater disposal for boats on inland waters

The rules for sewage disposal when operating on inland waters is much more controlled than the rules at sea. The Maritime & Coastguard Agency (MCA) and The Association of Inland Navigation Authorities (AINA) have set out the Inland Waterways Small Passenger Boat Code for use on inland waters, specifically for boats carrying less than 12 passengers, which can be downloaded from the www.gov.uk website (b3). This guide states that discharge of sewage into category A, B, C and D rivers, and any other inland waterway is not permitted. The rivers categories are described as follows by MCA (more details can be found on the MCA website) (b4):

- **Category A:** Narrow rivers and canals where the depth of water is generally less than 1.5 metres.
- **Category B:** Wider rivers and canals where the depth of water is generally 1.5 metres or more and where the significant wave height could not be expected to exceed 0.6 metres at any time.
- **Category C:** Tidal rivers and estuaries and large, deep lakes and lochs where the significant wave height could not be expected to exceed 1.2 metres at any time.
- **Category D:** Tidal rivers and estuaries where the significant wave height could not be expected to exceed 2.0 metres at any time.

There are several additional byelaws in operation in particular waters across the UK, and it would be prudent to check for any particular regulations regarding water disposal if you are travelling on these waters. A list of these byelaws, with links to the relevant documents, can be found on the Canal and River Trust website (b5).

If you are travelling on inland waters, you must ensure that any sanitisation system, capable of discharging overboard, is sealed and complies with the BS MA101 standards for toilet retention and re-circulation systems. The different types of toilet will be discussed later in this document.

The Boat Safety Scheme's guidance Part 9 offers the following advice for sealing a sea toilet:

- Fix the sea cock in a closed position, or;
- Fix heavy duty tape over the bowl (b6)

If you have a suitable cassette toilet, or toilet with a suitable holding tank, then they may be used on inland waters providing the waste is disposed of at a suitable disposal point on land.

B3.1.2 Blackwater disposal rules for smaller leisure craft at sea

The rules for vessels carrying under 15 passengers at sea are less clear. In essence it is deemed that as the discharge from small leisure craft is generally small and is dissipated quickly by the motion of the sea then discharge of blackwater straight into the sea is acceptable at any distance from the shore.

The Green Blue (the joint environment programme created by the Royal Yachting Association and British Marine) provide more detailed guidance on best practice for small leisure craft users at sea (b7). In essence, boat owners are encouraged to:

- Fit a holding tank and only discharge raw sewage when more than 3 miles from the coastline (using the increased currents and wave action to dilute the sewage).
- Use onshore facilities and pump out stations wherever possible to empty holding tanks.

Be aware that the rules for other European countries may be very different and it may be illegal to discharge to the sea even from smaller leisure boats. The Royal Yachting Association (RYA) lists the regulations in many different European waters on their holding tanks website page [\(b2\)](#).

For further details on blackwater disposal rules for large vessels at sea, please see Appendix 5.1.

B3.1.3 General greywater disposal for boats at sea and on inland waters

There are no particular rules for the disposal of greywater, but consideration should be taken of the following:

- Many standard cleaning products, such as washing up liquid, dishwasher tablets and washing machine liquid contain phosphates which have been known to cause issues in increasing plant growth and inducing eutrophication in rivers. If possible, you should look to use a low or no phosphate brand, many chandlers and boating websites stock a range of these products. The Canal and River Trust [\(b8\)](#) state that degreasers used in some detergents can also strip oil from fish gills making it difficult for them to breath.
- Rotting food encourages bacterial growth, depleting oxygen sources for native species so it makes sense to reduce the amount of food waste discharged with the greywater. Ensure that as much food as possible is collected and disposed of at land refuse centres.

Boats used on inland waterways belonging to the Canal and River Trust are required by law to have a registered licence. As part of the terms and conditions of this licence, the trust requests that only phosphate free detergents are used on board boats (particularly in connection with washing machines and dishwashers) [\(b9\)](#).

B3.1.4 Rules for the disposal of bilge water

MARPOL guidelines for ships under 400 tonnes and carrying over 15 passengers state that they may discharge bilge water containing oil into the sea so long as the oil content does not exceed 15 parts per million [\(b11\)](#). The Canal and River Trust also state that this concentration should be used as the guideline amount for inland waters also [\(b12\)](#). It is difficult for leisure boat owners to measure the amount of oil contained within the bilge water; if you are in any doubt that you have oil present in the water, you should collect the water and dispose of it at a boatyard with facilities, thus removing the pollution risk. Other ways to reduce discharge of oil with bilge water is discussed later in the document.

The Inland Waters Small Passenger Boat Code stipulates that boats operating on inland waters should have an oil tight tray fitted beneath every engine and gearbox to stop oil leaking into any other part of the boat or over the side [\(b3\)](#).

There are various devices that can be purchased in order to mop up spillages, such as the Bilge Sock, a video of which can be seen on the RYA YouTube channel [\(b13\)](#).

B3.2 Boat toilets

There are 4 main types of toilet widely available for use on board boats:

- Sea toilets
- Portable or Cassette toilets
- Pump out toilets
- Composting toilets

B3.2.1 Sea toilets

Suitable only for use on boats used at sea, these toilets discharge straight to the surrounding water through a sea cock (valve) that can be sealed off when the toilet is not in use.

Sea toilets usually have an inlet pipe feeding sea water into the bowl for flushing and an outlet pipe that takes the wastewater out to the sea. Some kind of pump is required to push the water out (as toilets are usually installed below the waterline) and this can be achieved through a manual pumping mechanism or an electric version. Toilets are usually sold with the pumps as part of the package.

The toilet itself is usually plastic or ceramic and resembles a traditional household toilet, which can be an important factor when comparing to a portable style toilet.

Manual toilets

With less installation equipment required, and no electrical source needed, manual sea toilets are the cost effective option. The manual function relates to the flush. A hand operated handle draws sea water into the bowl to flush whilst pushing the resulting wastewater out.

There are various models available from a variety of manufacturers and there are a wide range of distributors in the UK stocking systems and selling through online channels or chandlers.



Jabsco Twist and Lock Manual Toilets
Credit: Jabsco



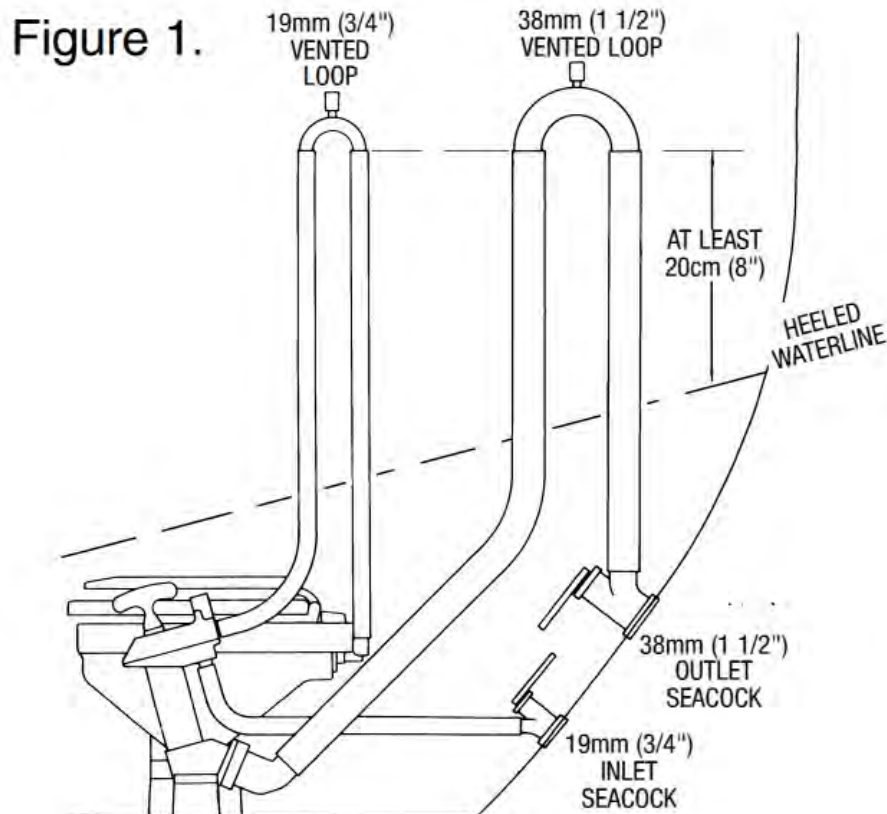
Force 4 Manual Sea Toilet
Credit: Force 4

Electric toilets

Electric toilets use power from the boat's battery to provide the action for pumping sea water in and wastewater out, as well as powering a macerator. Solid material is broken down and the resulting liquid produced allows for easier dispersion. Vacuum pumps are also available which considerably reduce the amount of flushing sea water used.

In both cases, sea toilets are fixed to the boat and will require some drilling in order to fit the inlet and outlet pipes.

When installing manual or electric sea toilets it is important to have a vent pipe, or siphon break, on the inlet and outlet pipes. Vents introduce an air pocket above the water line to prevent water freely siphoning into the toilet, as a result of wave action or heeling. Without this protection you may have a serious risk of flooding the boat.



Siphon vent installation

Credit: Jabsco

B3.2.2 Portable toilets

Sometimes called cassette or chemical toilets, portable toilets are a good solution if you have a small number of passengers on board and are able to access discharge points for disposal of waste (disposal points are discussed in the next section). The toilets consist of a toilet bowl connected directly to a removable storage chamber (usually located directly below the bowl). Once full, the chamber (cassette) can be removed from the unit and taken to a disposal point for emptying and cleaning ready for fresh usage.

Suitable for use both at sea and on inland waters, the volume of the toilets storage chamber can be up to around 20L, depending on the model, so enough for around 50 or so uses. Be aware that, depending on capacity, the chambers can get quite heavy when full. Some systems come with wheels and handles for easier transportation.

Brand names such as Elsan and Porta Pottis have become generic terms for portable toilets over the years, but there are many manufacturers to choose from, each having their own benefits regarding features or price.

Some examples of makes and models are shown below:



Dometic portable toilet

Credit: Dometic,



Thetford portable toilet

Credit: Thetford

Disposal points for inland waterways

All boats used or kept on inland waterways must be registered with the navigation authority of the waterway that you wish to use ([b10](#)). Most canals and rivers are serviced by the Canal and River Trust and for £7 you can buy a key which provides you access to the sanitation points along their waterways ([b14](#)). These points are only for the emptying of portable toilets and not the emptying of holding tanks.

Further information on the other waterways authorities and their facilities can be accessed through the Government Boat Registration pages ([b10](#)).

B3.2.3 Pump out toilets

Pump out toilets are generally used for a larger number of passengers and when a sea toilet with immediate discharge to the surrounding water isn't permissible (e.g. on inland waters). Pump out toilets consist of a toilet (see section above entitled sea toilets) with an attached holding tank located underneath the toilet or in a separate location if this is desirable. The holding tank is a permanent fixture in the boat and therefore must be pumped out to a waste disposal point when full.

Pump out options

If operating on inland waters, or other areas where it is not permissible to discharge directly to the sea, this waste must be pumped out to a registered facility. Many marinas and boatyards offer this facility and the Canal and River Trust have a comprehensive list ([b15](#)) of Trust and non-Trust operated facilities on inland waterways.

There are a variety of different kits that you can buy in order to pump out tanks, and many pump out points will take care of the 'dirty work' for you for a small fee.

If you are at sea in UK waters, and have a discharge point below the water line, then you can discharge the contents of holding tanks directly into the water, when it is permissible and advisable to do so (see 'Rules on blackwater disposal' section above).

Holding tank options

There are a variety of different types of tank on the market including:

- Stainless steel
- Plastic/ High Density Polyethylene (HDPE)
- Glass Reinforced Plastic (GRP)
- Flexible tanks

Generally speaking, HDPE tanks are most popular due to their strength, availability in a wide variety of sizes and shapes, low odour permeability and relatively low cost (b16). The Green Blue Guide recommends tanks of at least 6mm thickness (b17). The State of New Jersey Department of Environmental Protection Clean Marina Programme have a lot of detailed information on choosing and installing holding tanks found in their Sewage Holding Systems for Recreational Boats (Pump don't pump) document (b16).

Toilet/pump options

In the most part, the same type of toilets as discussed in the sea toilets section can be used with a holding tank.

Electric and vacuum toilets are generally preferred due to the fact that the waste needs to travel further and needs to be stored. These toilets macerate waste meaning that the pipework is less likely to get blocked, especially when there are longer stretches in which it needs to travel. Vacuum toilets, particularly, use considerably less water per flush, thereby extending the emptying periods for the tank.

There are many models of electric and vacuum toilets on the market, examples of which are shown below:



Dometic Sealand Vacuum Toilet
Credit Dometic



Jabsco Electric Toilet
Credit Jabsco

Best practice guidelines for wastewater storage on boats (in accordance with The Green Blue guidelines)

- Deck pump out points must comply with ISO 8099 standards and carry a clear identification plate or stamp on the fittings.
- A tank vent must also be installed, allowing a better flow of oxygen to combat bad smells and to prevent a vacuum when pumping out the system.
- A carbon filter is recommended for use in the vent line to minimise smells and the vent should be located as far as possible away from any accommodation.
- Sanitary grade pipework should be used for all waste connections.

More details on the guidelines and how to install a holding tank can be found in the useful ‘The Green Blue guide to holding tank installation’ [\(b17\)](#).

B3.2.4 Composting toilets

The use of composting toilets is a relatively new thing on boats, but several different makes of toilet are available and there are various blogs and forums where advocates and opponents talk about their features and benefits.

In essence, a composting toilet works by separating the solid and liquid waste and allowing the solid waste to dry out and decompose. The liquids are stored and need to be emptied from the tank. They can be stored under the toilet (in a cassette style container), or pumped to a holding tank. The disposal of this liquid will be in line with the guidelines already described in the disposal of blackwater, and this component of the waste will still be deemed as sewage. **For this reason, it must be disposed of into a registered pump out station if it is not permissible to discharge to surrounding water (e.g. when travelling on inland waterways).**

Similarly, the solids will need to be emptied once the tank becomes full, but with very little liquid stored in this tank the emptying is infrequent. Many manufacturers maintain that the resulting solid component can be used as compost, according to the information contained on the Ecotoilet website [\(b18\)](#). ‘In order to ensure that all pathogens or other harmful bacteria are neutralised’, the Environment Agency advise that such compost material should be kept on site for 26 weeks, but after that time it can be removed to another site or disposed of in domestic refuse or recycling systems.’ [\(b19\)](#).

An important thing to note about composting toilets is that they require no flushing water, thereby dramatically decreasing the storage space required. For this reason, they are often called ‘dry toilets’.

Composting toilets usually require electricity in order to draw moisture from the solid chamber and 12V systems are available for use on boats.

There are several models of composting toilet available for use on boats, examples of which are shown below:



Separett Villa composting toilet
Credit: Eco-toilets Ltd



Airhead composting toilet
Credit: Airhead

B4. Collection and disposal of wastewater in caravans

This part of the guide addresses the storage and disposal of wastewater from caravans, including motorhomes and touring caravans.

B4.1 Rules for disposal of wastewater from caravans

For definitions on different types of wastewater, please see the earlier section B2 ‘What is wastewater and how is it created?’

You will be producing two different types of wastewater on board a caravan (greywater and blackwater) and generally the two different types of water are stored separately.

B4.1.1 Rules for the disposal of blackwater

The Environment Agency issue rules for the disposal of sewage. Their guides for the discharge of water both to waterways ([b20](#)) and directly to the ground ([b19](#)) stipulate that sewage must be treated via a septic tank or sewage treatment system, therefore it is illegal to empty toilet water directly onto land or into a river. Sewage must be treated. Most caravan sites will therefore have a connection to the mains sewerage for the emptying of chemical toilets or other on board toilet facilities. If sites are in a remote location they will often make use of a septic tank or sewage treatment plant, which will be used to collect and treat blackwater.

B4.1.2 Rules for the disposal of greywater

The rules for the disposal of greywater are less clear. There are no firm guidelines provided by the Environment Agency on this subject, possibly due to the fact that greywater is distinguishable from blackwater by the low risk that it causes to human health.

Typically, the disposal of greywater will be determined by the caravan site that you are visiting. Many will ask you to tip greywater into hedges, particular in the dry summer months (if the site is operating a septic tank system they may encourage this so as not to overload their septic tank with greywater and leave space for blackwater). Some will provide a separate wastewater drain, which is particularly useful if you are using an onboard tank with a tap. Some full facility sites might provide all services for electricity, fresh water and wastewater drainage at each pitch. More information on specific storage and disposal options will be addressed later in the guide.

B4.2 Storage and disposal of blackwater from caravans

Where onsite facilities are available holiday makers might prefer to use standard toilets, but if facilities don't exist, an on board toilet might be a requirement. Many newer touring caravans and motorhomes come equipped with a plumbed in solution, but if you need a replacement or if you need to choose a new system, there are several options to choose from.

There are typically two main types of toilet for use on caravans: an all in one portable toilet system where the waste is stored beneath the toilet bowl, and an integrated system which is plumbed into the caravan and is connected to a removable cassette that is usually accessible from outside the vehicle. Although there is no standing water present in the toilet bowl, water is used to flush the toilet through after use.

Another option might be the more basic bucket type of toilet, but this guide will focus on the main flushable styles.

B4.2.1 Types of toilet

Portable toilet

Portable toilets usually consist of a toilet bowl, with a chamber for storing flush water, and a storage chamber at the bottom for collecting the waste. The storage chamber can be disconnected from the toilet and taken to a disposal point.

Various models are available in a range of different heights and finishes, and with varying capacities, so choosing a toilet is generally dependent on usage and budget. Some examples from across the budget range are shown below:



Freedom Trail portable flush toilet
Credit: Freedom Trail



Dometic 972 portable flush toilet
Credit: Dometic



Porta Potti Excellence portable flush toilet
Credit: Thetford

Cassette toilet

This style of toilet resembles a household toilet in a plastic or ceramic finish and is typically installed in most modern caravans.



Swift Lifestyle toilet
Credit: Marquis Leisure

The waste flows into a container (commonly called a cassette) that is accessed through the exterior side of the caravan, usually through a lockable door. Toilets usually have an alert system to let you know when the cassette needs emptying and the cassette simply slides out of the opening. Most modern cassettes have integrated handles and wheels for easy transport to the disposal points [\(b21\)](#).



Chemical toilet cassette
Credit: Popupcamping101

Some systems have an indicator that alerts you when the tank is full, although if you have access to disposal points you might want to empty the system more regularly.

B4.2.2 Disposal points for chemical toilets

Most caravan sites now have designated chemical toilet emptying points (sometimes called a Chemical Disposal Point or Elsan Disposal Point) [\(b22\)](#). This drain will be connected to either the mains sewer system or, if the site is off grid, to a septic tank or package sewage treatment plant.

You must empty chemical toilets only into designated drains and **never** into standard greywater sites or drains. The bacteria and other microbes present in sewage can reach harmful levels within the toilets and every precaution should be taken to dispose of the contents with regard to the health and safety of yourself and other site users. For more information on disposal points visit The Camping and Caravanning Club toilets page [\(b22\)](#) or read their guide for caravan site owners on the provision of disposal facilities [\(b23\)](#).

If a site does not have a designated place for disposal, or if you have been ‘wild’ camping without access to washroom facilities, then you have two options.

The first option might be to spend the following night on a site with emptying facilities and to take your cassette along to be emptied. Some sites offer Motorhome Service Points where, for a small fee, you are able to use the waste facilities and stock up on fresh water without paying for an overnight stay [\(b24\)](#).

The second option is to bury the chemical toilet waste at the area where the waste was produced. The Environment Agency have allowed an exemption from transporting the waste to a disposal point [\(b25\)](#) as long as:

- The waste is buried at the area where the toilet was used.
- It is not deposited within 10 metres of any watercourse or 50 metres of any spring, well or borehole.
- You deposit no more than one cubic metre of waste in any 12-month period in this way.

Be aware that the flush water and wastewater contained within the toilet will add to the weight of your caravan, see the Camping and Caravanning Club guide to Matching Car and Caravan [\(b26\)](#).

B4.2.3 Composting toilets

A composting toilet is another, chemical free, option for use on caravans. See the composting toilet information in the 'Boat Toilets' section for further information. The makes and models suitable for use on boats can also be used on caravans with the liquid component emptied in the same way as portable toilets.

One important thing to note is that the liquid element is still classed as sewage/blackwater. There have been instances of caravan users disposing of the urine/liquid into hedges or surrounding land, as if it were greywater. This practice is not permissible. **The liquid should be disposed of in a chemical disposal point to decrease the spread of harmful pathogens.**

B4.3 Chemical toilet maintenance

Ensuring that your chemical toilet is working effectively is essential and there are a few elements to consider to ensure that you are unlikely to encounter problems.

B4.3.1 Flushable items

The only items that you should flush down a chemical toilet are solid and liquid waste and toilet paper. Nothing else. Sanitary items, nappies and wipes can block toilets stopping the waste from entering the holding chamber or preventing it leaving when you come to empty it out. The resulting waste will eventually be discharged to the mains sewers or to a septic tank or small wastewater treatment system (the latter two systems are more susceptible to contamination and blockages which may stop them working).

Follow the manufacturers' guidelines for your system regarding the use of chemicals and toilet paper.

B4.3.2 Chemical toilet additives

There are a whole host of chemical toilet products on the market with a variety of features and benefits; the manufacturer of your chemical toilet might recommend a particular version. There are generally two types of chemical on the market, sometimes referred to as blue and pink liquids from historical association with the products from one particular manufacturer, one for the wastewater tank (sometimes called the blue or green liquid) and one for the flush tank (sometimes called the pink liquid). Make sure that you follow the directions on the product for the correct dosing.

Wastewater tank chemicals can perform several functions within the wastewater tank:

- Kill harmful bacteria

- Neutralise odours
- Breakdown toilet waste (solids and toilet paper)
- Help preserve the longevity of the system

The flush tank chemicals aim to:

- Provide a protective layer on the toilet bowl, preventing and removing deposits
- Provide a fragrance to mask smells

It is not advisable to use household bleach in portable and cassette toilets, which are largely constructed from plastic. Some toilet chemicals may also contain formaldehyde which can have environmental impact, particularly on aquatic life, if not disposed of correctly. There are a range of products on the market that do not contain formaldehyde. Be aware that both bleach and formaldehyde can cause problems if they end up in septic tanks or package sewage treatment plants as they can kill the naturally occurring bacteria that help to break down the effluent.

B4.4 Storage and disposal of greywater from caravans

You will generally produce greywater through the use of the sink and showers on board caravans. Most caravans do not have an on board holding tank for the collection of this wastewater so it needs to be disposed of as it is produced, or collected for disposal at a later date.

Your caravan will likely have two outlet pipes, one for the kitchen sink and one for the bathroom sink (and shower if you have one fitted).

There are various different connectors available to meet these two outlets and drain the water into one hose, one example is shown below.



Connection for water outlet
Credit: Pennine Leisure Supplies

There are a variety of different flexible and rigid plastic hoses available to move the water away from the connector to whichever disposal point you are using.

B4.4.1 Mains wastewater connection

If you have a mains connection on your pitch (sometimes called a superpitch) then you can run a hose directly into the drain.

B4.4.2 Wastewater collection point

If you are required to collect wastewater and dispose of it in a communal collection point, then you will need a wastewater collection tank. There are a variety of different models on the market. Many new models have a flat design so that you can place them easily underneath the caravan, and have built in handles and wheels for easier transport to the disposal point. Some also have a platform for placing toilet cassettes on, so that you can transport both waste tanks in one go.

Typically, a wastewater collection tank will store between 25 and 45 litres.

An example is shown below:



Wastemaster water collection tank
Credit: Wastemaster

Some caravans come equipped with built in holding tanks, although this is more unusual. These tanks can hold greater volumes of water, but will add to the overall weight of the caravan (something that you will need to be aware of if you are driving with a full tank).

It makes sense to regularly empty and rinse out tanks, particularly as small particles of food can enter via the sinks. For periods when the caravan is not in use, it makes sense to fully drain down and dry the pipework to prevent smells and damp. Many tank manufacturers recommend certain cleaning chemicals to prevent odours occurring.

Although a few years old, The Caravan Club have produced a great article on the use and maintenance of wastewater tanks and pipes for further, more detailed, information ([b27](#)).

B5. Appendix

B5.1 Blackwater disposal rules for large vessels at sea

The International Maritime Organisation (IMO) is the United Nations special agency responsible for the prevention of marine pollution by ships. In 1973, they launched MARPOL as the International Convention for the Prevention of Pollution from Ships. The regulations set within MARPOL aim to prevent operational and accidental pollution at sea. Annex IV of this document sets out the guidelines for the prevention of pollution by sewage on ships and came into force in September 2003 ([b28](#)).

Although this regulation is comprehensive it deals only with vessels that are carrying 15 or more passengers, so this won't apply to the majority of leisure craft. If your vessel does fall within these boundaries, then you will need to ensure that you comply with the following rules:

- You may discharge raw sewage (blackwater) when more than 12 nautical miles out to sea
- If your vessel is within 3 nautical miles of the shore, then you may only discharge comminuted and disinfected sewage or water that has been treated by a sewage treatment system.
- Discharge in any situation should not be instantaneous, but at a moderate rate whilst travelling at not less than 4 knots.

There are a variety of on-board sewage treatment plants available that work to disinfect and macerate the wastewater to levels safe enough to discharge overboard. These systems are reasonably expensive and only really suitable for larger crafts.

C. References

C1 Section A references

- (a1) Council Directive 98/83/EC on the quality of water intended for human consumption.
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1998:330:0032:0054:EN:PDF>
- (a2) S.I. 1999 No 1148. The Water Supply (Water Fittings) Regulations 1999
<http://dwi.defra.gov.uk/stakeholders/legislation/ws%28fittings%29regs1999.pdf> S.I. 1999 No 1148.
- (a3) S.R. 2009 No.255 The Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 <https://www.niwater.com/sitefiles/resources/pdf/the-water-supply-water-fittings-regulations-northern-ireland-2009.pdf>
- (a4) The Water Supply (Water Fittings)(Scotland) Byelaws 2014
<http://www.scottishwater.co.uk/assets/domestic/files/investment%20and%20communities/water%20byelaws%20consultation%20apr%202014/thewatersupplywaterfittingscotlandbyelaws2014finaldraftfornotification.pdf>
- (a5) The Water Regulations Advisory Scheme
<https://wras.co.uk>
- (a6) WRAS Advice for consumers – What are the water regulations? Web page
https://www.wras.co.uk/consumers/advice_for_consumers/what_are_the_water_regulations/
- (a7) The Caravan Club -Technical Information – Water Matters
<http://www.caravanclub.co.uk/media/1022808/water-matters-mo.pdf>
- (a8) WRAS Installation Guide - Holiday and Residential Parks
https://www.wras.co.uk/downloads/public_area/publications/general/holiday_parks.pdf
- (a9) WRAS Information and Guidance Note 9-06-02 Information for Operating Plumbing Systems for the Supply of Water for Domestic Purposes to Boats in Marinas
https://www.wras.co.uk/downloads/public_area/publications/general/ign_9-06-02_marinas.pdf/
- (a10) BoatTest.com Newsletter 14 July 2010
http://www.boattest.com/view-news/4218_how-to-make-boat-water-drinkable
- (a11) WRAS -Protecting Plumbing Systems in Caravan Holiday Homes and Park Homes against Damage by Freezing
https://www.wras.co.uk/downloads/public_area/publications/general/winterising_by_draining_down.pdf/
- (a12) Solid Fuel Technology Institute – Stoves in Boats
<http://www.stovesonline.co.uk/stove-chimney-documentation/Installing-stoves-on-boats.pdf>
- (a13) HSE Guidance – Managing Legionella in Hot and Cold Water Systems
<http://www.hse.gov.uk/healthservices/legionella.htm>
- (a14) Water Supply (Water Quality) Regulations (2000) (Unofficial Consolidated version 2010)
http://dwi.defra.gov.uk/stakeholders/legislation/ws_wqregs2000_cons2010.pdf
- (a15) The Water Supply (Northern Ireland) Regulations 2007
<http://www.legislation.gov.uk/nisr/2007/147/contents/made>

- (a16) The Public Water Supplies Regulations (Scotland) 2014
<http://www.legislation.gov.uk/ssi/2014/364/contents/made>
- (a17) S. I. 2001 No 3911 (W.323) The Water Supply (Water Quality) Regulations 2001
http://dwi.defra.gov.uk/stakeholders/legislation/ws_wqregs2001.pdf
- (a18) WHO 2011 Guidelines for Drinking-water Quality Fourth Edition
http://www.who.int/water_sanitation_health/publications/dwq_guidelines/en/
- (a19) S.I 2009 3101 The Private Water Supplies Regulations 2009
<http://dwi.defra.gov.uk/stakeholders/legislation/pwsregs2009.pdf>

C2 Section B references

- (b1) Septic tanks and treatment plants: permits and general binding rules, Environment Agency, <https://www.gov.uk/permits-you-need-for-septic-tanks/general-binding-rules>
- (b2) Holding Tanks, Royal Yachting Association (RYA)
<http://www.rya.org.uk/infoadvice/boatingabroad/Pages/holdingtanks.aspx>
- (b3) Inland Waterways Small Passenger Boat Code, Maritime & Coastguard Agency and the Association of Inland Navigation Authorities
<https://www.gov.uk/government/publications/inland-waters-small-passenger-boat-code>
- (b4) Categorisation of waters, Maritime & Coastguard Agency
<https://mcanet.mcga.gov.uk/public/c4/cat-waters/index.htm>
- (b5) Byelaws, Canal and River Trust
<https://canalrivertrust.org.uk/the-publication-scheme/our-publication-scheme/who-we-are-and-what-we-do>
- (b6) Boat Safety Scheme Guidance, Part 9 Pollution, Boat Safety Scheme
<http://www.boatsafetyscheme.org/boat-examination/non-private-boats/part-9-pollution/pollution/>
- (b7) Best practice guidance on sewage disposal, The Green Blue
<http://thegreenblue.org.uk/Boat-Users/Sewage-and-Waste/Boaters-Best-Practice-Sewage>
- (b8) Caring for the Environment Guide, The Canal and River Trust
<https://canalrivertrust.org.uk/enjoy-the-waterways/boating/navigating-the-waterways-boating/caring-for-the-environment>
- (b9) General Terms and Conditions for Boat Licences, Canal and River Trust, November 2013
<https://canalrivertrust.org.uk/media/library/654.pdf>
- (b10) Register a Boat, Gov.uk
<https://www.gov.uk/register-a-boat/overview>
- (b11) MARPOL annex IV, International Maritime Organisation, September 2003
[http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-\(MARPOL\).aspx](http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx)

(b12) Oil on the Water! Sneak a peek at your leaky bilge, Canal and River Trust, January 2015

<https://canalrivertrust.org.uk/news-and-views/blogs/environment-team/oil-on-the-water-sneak-a-peek-at-your-leaky-bilge>

(b13) Bilge Sock video, RYA

<https://www.youtube.com/watch?v=50HPwvN7Dhc&feature=youtu.be>

(b14) The online shop for boats and boating, Canal and River Trust

<https://shop.canalrivertrust.org.uk/shop>

(b15) Water points and sewage disposal, Canal and River Trust (b156)

<https://canalrivertrust.org.uk/enjoy-the-waterways/boating/navigating-the-waterways-boating/services-for-boats/water-points-and-sewage-disposal>

(b16) Sewage Holding Systems for Recreational Boats (Pump don't pump), The State of New Jersey Department of Environmental Protection

<http://www.nj.gov/dep/njcleanmarina/>

(b17) The green guide to holding tank installation, The Green Blue, January 2016

<http://thegreenblue.org.uk/News/2016/January/New-green-guide-to-holding-tank-installation>

(b18) FAQ – storage, disposal and composting, Eco Toilets

<http://www.eco-toilets.co.uk/faq-storage-and-composting/>

(b19) General binding rules: small sewage discharge to the ground, Environment Agency, 11 December 2015

<https://www.gov.uk/guidance/general-binding-rules-small-sewage-discharge-to-the-ground>

(b20) General binding rules: small sewage discharge to a surface water, Environment Agency, 16 June 2015

<https://www.gov.uk/guidance/general-binding-rules-small-sewage-discharge-to-a-surface-water>

(b21) Toilet cassette, popupcamping101.com

<http://www.popupcamping101.com/bathroom-on-wheels/>

(b22) Toilets, The Camping and Caravanning Club

<http://www.campingandcaravanningclub.co.uk/helpandadvice/gettingstarted/campingequipment/toilets/>

(b23) Provision of Chemical Toilet Facilities, The Camping and Caravanning Club,

<https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjcturvhpnMAhXG1RQKHfKDCsgQFggoMAA&url=http%3A%2F%2Fwww.campingandcaravanningclub.co.uk%2FGetAsset.aspx%3Fid%3DfAAxADQAOQA1ADcAfAB8AFQAcgB1AGUAfAB8ADAAfAA1&usg=AFQjCNEflGNfdA6-WHcdjcrMnzM0oVnO2Q&sig2=r0O0FyOIqt4wOfYHVU0XQ>

(b24) Motorhome Service Points, The Camping and Caravanning Club

<http://www.campingandcaravanningclub.co.uk/ukcampsites/clubsites/motorhomeservicepoints/>

(b25) Waste exemption: D3 depositing waste from a portable sanitary convenience, Environment Agency, 28th April 2014
<https://www.gov.uk/guidance/waste-exemption-d3-depositing-waste-from-a-portable-sanitary-convenience>

(b26) Matching Car and Caravan, The Camping and Caravanning Club
<http://www.campingandcaravanningclub.co.uk/helpandadvice/technicalhelp/towing/matching-car-and-caravan/>

(b27) Wastewater systems: practical, John Wickersham, The Caravan Club Magazine, March 2004
<http://www.caravanclub.co.uk/caravanclubapps/media/18605/PRACTICALWasteWaterSystemsMar04.pdf>

(b28) MARPOL annex I, Chapter 3, Part C, regulation 15, International Maritime Organisation
http://www.marpoltraining.com/MMSKOREAN/MARPOL/Annex_I/r15.htm

D. Additional Useful Sources and Links

- “Understanding Boat Plumbing and Water Systems” John C. Payne published Sheridan House ISBN 978-1-57409-263-9
- “ Boat Plumbing” by Don Casey - web page
<http://www.boatus.com/boattech/casey/boat-plumbing.asp>
- “Design your own RV or Caravan Plumbing” web page
- <http://caravansplus.com.au/catalog/help-design-your-plumbing-system.php> This is a commercial site and this Guide offers no endorsement
- “Guide to caravan water pipes and pumps” by John Wickersham -web page
<http://www.practicalcaravan.com/advice/32060-guide-to-caravan-water-pipes-and-pumps>
- <http://moore2life.co.uk/boatsystems/plumbing.htm> -web page. A simple summary of narrow boat plumbing but of more general applicability.