



BSI Standards Publication

Sanitary installations

Part 3: Code of practice for the selection, installation and maintenance of sanitary and associated appliances

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Foreword

Publishing information

This part of BS 6465 is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 March 2020. It was prepared by Technical Committee B/209, *General building codes*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This part of BS 6465 supersedes [BS 6465-3:2006](#), which is withdrawn.

Relationship with other publications

BS 6465, *Sanitary installations*, is issued in four parts:

- Part 1: *Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances*;
- Part 2: *Code of practice for space requirements for sanitary appliances*;
- Part 3: *Code of practice for the selection, installation and maintenance of sanitary and associated appliances*;
- Part 4: *Code of practice for the provision of public toilets*.

Part 1 provides recommendations for the design of sanitary facilities and scales of provision of sanitary and associated appliances in new buildings and buildings undergoing major refurbishment. It also covers the recommended scale of provision of portable toilets.

Part 2 provides recommendations for the space requirements around all sanitary appliances to ensure convenience in use and to facilitate maintenance and cleaning.

Part 4 provides design considerations and recommendations for assessing the positioning and number of public toilets. It also includes publicly available toilets.

Information about this document

This is a full revision of the standard, and introduces the following principal changes.

- The standard has been extended by over 20 pages from the 2006 edition.
- Although the basic section structure of general/selection/installation/maintenance remains, there has been substantial restructuring within those sections.
- The document has been updated to reflect practices and expectations of the early 21st century.
- Revisions to other parts of BS 6465, along with relevant standards such as [BS 8300](#) and BS EN 752, have been taken into account in revising this part of BS 6465.
- Changes in legislation within the UK and Europe have influenced the guidance provided.
- New figures and text have been produced to explain the backflow prevention techniques needed for installations connected to UK water supplies.
- New tables have been added to aid the selection of various items, including drainage systems and WCs. Existing tables have been revised and often extended to cover new and emerging options as well as new legislation.

This publication can be withdrawn, revised, partially superseded or superseded. Information regarding the status of this publication can be found in the Standards Catalogue on the BSI website at bsigroup.com/standards, or by contacting the Customer Services team.

Where websites and webpages have been cited, they are provided for ease of reference and are correct at the time of publication. The location of a webpage or website, or its contents, cannot be guaranteed.

Use of this document

As a code of practice, this British Standard takes the form of guidance and recommendations.

It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

Presentational conventions

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Attention is drawn to the requirements of the Construction Products Regulation 305/2011 [1] in relation to CE marking of products to the appropriate harmonized standard.

Particular attention is drawn to the water supply, drainage and related legislation and legislative guidance listed in [Annex A](#). The following generic references are made throughout this document.

- a) Water Fittings Regulations. In this document, the following national regulations, which set requirements relating to plumbing systems in premises to which a supply of public mains water has been provided, are referred to as “Water Fittings Regulations ([2], [3], [4])”:
 - 1) Water Supply (Water Fittings) Regulations 1999, as amended [2], in England and Wales;
 - 2) Water Supply (Water Fittings) (Scotland) Byelaws 2014 [3], in Scotland;
 - 3) Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 [4], in Northern Ireland.
- b) Building Regulations. In this document, the following national regulations, which set requirements for the facilities, design and construction of buildings, are referred to as “Building Regulations ([5] to [8])”:
 - 1) Building Regulations 2010 [5], in England and Wales, as amended by the Welsh Government for application in Wales only [6];
 - 2) Building (Scotland) Act 2003 [7], in Scotland;
 - 3) Building Regulations (Northern Ireland) 2012 [8], in Northern Ireland.

- c) Water Quality Regulations. In this document, the following national regulations, which set minimum requirements for wholesome water, are referred to as “Water Quality Regulations ([9] to [16])”:
- 1) Water Supply (Water Quality) Regulations 2016 [9], in England;
 - 2) Water Supply (Water Quality) Regulations (Northern Ireland) 2017 [10], in Northern Ireland;
 - 3) Public Water Supplies (Scotland) Regulations 2014 [11], in Scotland;
 - 4) Water Supply (Water Quality) Regulations 2018 [12], in Wales;
 - 5) Private Water Supplies (England) Regulations 2016 [13], in England;
 - 6) Private Water Supplies Regulations (Northern Ireland) 2017 [14], in Northern Ireland;
 - 7) Private Water Supplies (Scotland) Regulations 2006, as amended [15], in Scotland;
 - 8) Private Water Supplies (Wales) Regulations 2017 [16], in Wales.

Section 1: Scope, normative references and definitions

1 Scope

This part of BS 6465 gives recommendations for the selection, installation and maintenance of sanitary (water-using and waterless) and associated appliances to be provided in new and refurbished buildings.

It does not cover specialist appliances, such as those used for commercial laundry or catering premises, or those found in hospitals, health spas, laboratories and similar establishments.

NOTE 1 Sanitary and associated appliances in hospitals and other healthcare buildings are covered by the general recommendations of this standard. Information on the scale of provision, ergonomic data and the special requirements for sanitary and associated appliances in hospitals can be found in the various guidance documents produced by NHS, e.g. Health Building Note 00-10 [17].

This part of BS 6465 does not deal with the detailed provisions of water supply, sanitary pipework or drainage.

NOTE 2 Information on water supply is given in BS EN 806 (all parts) and [BS 8558](#); sanitary pipework in BS EN 12056-2; and drainage in BS EN 752.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document¹⁾. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

[BS 1206](#), Specification for fireclay sinks: dimensions and workmanship

[BS 1212-2](#), Float operated valves — Part 2: Specification for diaphragm type float operated valves (copper alloy body) (excluding floats)

[BS 1212-3](#), Float operated valves — Part 3: Specification for diaphragm type float operated valves (plastics bodied) for cold water services only (excluding floats)

[BS 1212-4](#), Float operated valves — Part 4: Specification for compact type float operated valves for WC flushing cisterns (including floats)

[BS 1254](#), Specification for WC seats (plastics)²⁾

[BS 2081-1](#), Closets for use with chemicals — Part 1: Specification for portable closets

[BS 2081-2](#), Closets for use with chemicals — Part 2: Specification for permanently installed closets

[BS 4880-1](#), Specification for urinals — Part 1: Stainless steel slab urinals

[BS 5388](#), Specification for spray taps

[BS 5779](#), Specification for spray mixing taps

[BS 5906](#), Waste management in buildings — Code of practice

[BS 6100-7](#), Building and civil engineering — Vocabulary — Part 7: Services

¹⁾ Documents that are referred to solely in an informative manner are listed in the Bibliography.

²⁾ This standard also gives an informative reference to BS 1254:1981.

- [BS 6465-1](#), *Sanitary installations — Part 1: Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances*
- [BS 6465-2](#), *Sanitary installations — Part 2: Space recommendations — Code of practice*
- [BS 6675](#), *Specification for servicing valves (copper alloy) for water services*
- [BS 6920-1](#), *Suitability of non-metallic materials and products for use in contact with water intended for human consumption with regard to their effect on the quality of the water — Specification*
- [BS 7671](#), *Requirements for Electrical Installations — IET Wiring Regulations*
- [BS 8300-2](#), *Design of an accessible and inclusive built environment — Part 2: Buildings — Code of practice*
- [BS 8525-1](#), *Greywater systems — Part 1: Code of practice*
- [BS 8525-2](#), *Greywater systems — Part 2: Domestic greywater treatment equipment — Requirements and test methods*
- [BS 8558](#), *Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages — Complementary guidance to BS EN 806*
- BS EN 31, *Wash basins — Connecting dimensions*
- BS EN 35, *Pedestal and wall-hung bidets with over-rim supply — Connecting dimensions*
- BS EN 200, *Sanitary tapware — Single taps and combination taps for water supply systems of type 1 and type 2 — General technical specification*
- BS EN 232, *Baths — Connecting dimensions*
- BS EN 274-1, *Waste fittings for sanitary appliances — Requirements*
- BS EN 695, *Kitchen sinks — Connecting dimensions*
- BS EN 806 (all parts), *Specifications for installations inside buildings conveying water for human consumption*
- BS EN 816, *Sanitary tapware — Automatic shut-off valves PN 10*
- BS EN 817, *Sanitary tapware — Mechanical mixing valves (PN 10) — General technical specifications*
- BS EN 997:2018, *WC pans and WC suites with integral trap*³⁾
- BS EN 1111, *Sanitary tapware — Thermostatic mixing valves (PN 10) — General technical specification*
- BS EN 1112, *Sanitary tapware — Shower outlets for sanitary tapware for water supply systems type 1 and type 2 — General technical specification*
- BS EN 1113, *Sanitary tapware — Shower hoses for sanitary tapware for water supply systems of type 1 and type 2 — General technical specification*
- BS EN 1286, *Sanitary tapware — Low pressure mechanical mixing valves — General technical specification*
- BS EN 1287, *Sanitary tapware — Low pressure thermostatic mixing valves — General technical specification*
- BS EN 12056-4, *Gravity drainage systems inside buildings — Part 4: Wastewater lifting plants — Layout and calculation*⁴⁾
- BS EN 12109, *Vacuum drainage systems inside buildings*⁵⁾

³⁾ At the time of publication of this part of BS 6465, the 2018 edition of BS EN 997 is not harmonized.

⁴⁾ This standard also gives an informative reference to the whole BS EN 12056 series.

⁵⁾ This standard also gives an informative reference to BS EN 12109:1999.

BS EN 12221-1, *Child use and care articles — Changing units for domestic use — Part 1: Safety requirements*

BS EN 13310, *Kitchen sinks — Functional requirements and test methods*

BS EN 13407, *Wall-hung urinals — Functional requirements and test methods*

BS EN 13828, *Building valves — Manually operated copper alloy and stainless steel ball valves for potable water supply in buildings — Tests and requirements*

BS EN 14055:2018, *WC and urinal flushing cisterns*⁶⁾

BS EN 14296, *Sanitary appliances — Communal washing troughs*

BS EN 14528, *Bidets — Functional requirements and test methods*

BS EN 14688, *Sanitary appliances — Wash basins — Functional requirements and test methods*

BS EN 14743, *Water conditioning equipment inside buildings — Softeners — Requirements for performance, safety and testing*

BS EN 15091, *Sanitary tapware — Electronic opening and closing sanitary tapware*

BS EN 16145, *Sanitary tapware — Extractable outlets for sink and basin mixers — General technical specification*

BS EN 16146, *Sanitary tapware — Extractable shower hoses for sanitary tapware for supply systems type 1 and type 2 — General technical specification*

BS EN 16941-1, *On-site non-potable water systems — Part 1: Systems for the use of rainwater*

BS EN 60335-1, *Household and similar electrical appliances — Safety — Part 1: General requirements*

BS EN 60335-2-16, *Household and similar electrical appliances — Safety — Part 2-16: Particular requirements for food waste disposers*

BS EN ISO 11600, *Building construction — Jointing products — Classification and requirements for sealants*

3 Terms and definitions

For the purposes of this part of BS 6465, the terms and definitions given in [BS 6100-7](#) and the following apply.

3.1 associated appliance

appliance not connected to the water supply and drainage system but used in conjunction with sanitary appliances

NOTE Examples of associated appliances include hand driers and sanitary disposal units.

3.2 automatic public convenience (APC)

stand-alone public toilet with WC and washbasin that cleans automatically after use

NOTE These are sometimes known as “automatic public toilets” (APTs).

3.3 bathroom

room primarily used for body washing, which contains a bath and/or shower, and can also contain a washbasin, WC or bidet

⁶⁾ At the time of publication of this part of BS 6465, the 2018 edition of BS EN 14055 is not harmonized.

3.4 dwelling

house or apartment for people living as a family or single household

3.5 frame

structure used to support an individual sanitary or associated appliance, or a collection of appliances, complete with their associated pipework

3.6 public toilet

toilet for use by any member of the public in a public area, which can be on- or off-street

NOTE Public toilets are usually provided and maintained by the local authority.

3.7 publicly available toilet

off-street toilet on private property to which the general public (as well as customers) might have access

NOTE A toilet in a shopping mall is an example of a publicly available toilet.

3.8 sanitary accommodation

room or building housing sanitary appliances

NOTE Includes bathrooms, toilets, shower rooms, cloakrooms, kitchens and utility rooms.

3.9 sanitary appliance

fixed appliance normally connected to a water supply and to a drain, used for the provision of water, or for cleaning, or for wastewater disposal

NOTE Sanitary appliances, include, for example, WCs, urinals, baths, showers, washbasins, sinks, bidets and drinking fountains. The term also covers appliances with a similar function that are not connected to a water supply or a drain, for example, waterless urinals.

3.10 sanitary disposal unit

container for disposal of sanitary protection, disposable nappies, incontinence protection and similar non-flushable products

3.11 shower fitting

water outlet and terminal fitting for a shower

3.12 shower unit

sanitary appliance comprising a shower tray, drainage and enclosure, with a water supply and shower fitting

3.13 street urinal

stand-alone unit incorporating a urinal, which is positioned in a street or other external area and is either permanent or temporary

3.14 toilet

room in which WC(s) and/or urinal(s) are installed and which is used solely for excretory purposes and associated washing

3.15 urinal

sanitary appliance used for reception and disposal of urine

3.16 wash fountain

washbasin comprising a large circular bowl supported on a pedestal, having a central column rising from the bowl carrying a number of spray heads, at which more than one person can wash at the same time

3.17 washbasin

basin for general washing, or small basin used for handwashing only

3.18 washing trough

washbasin, of elongated shape in plan, at which more than one person can wash at the same time

3.19 waste disposal unit

electrically operated device that reduces kitchen or other waste and discharges to drain using a flow of water

3.20 water management system

network of electronic sensors and controls linked to taps, shower units, urinals, etc. that can provide data and aid maintenance through the monitoring of flow rates, temperatures and other parameters

3.21 waterless closet

WC ([3.23](#)) that does not require a water flush and is not normally connected to a traditional drainage system

NOTE Waterless closets are also known as waterless toilets.

3.22 waterless urinal

urinal that is not connected to a water supply for flushing

3.23 WC (water closet)

WC pan, together with the associated plumbing, fittings, and a flushing device, cistern or other mechanism for disposal of the contents

NOTE 1 A waterless closet is an example of an alternative mechanism for disposal.

NOTE 2 The terms "chemical toilet", "separating toilet", "vacuum toilet" and "reinvented toilet" refer to WCs as defined in this part of BS 6465.

3.24 WC pan

bowl-shaped appliance for receiving faecal matter, urine and toilet paper

3.25 wet room

shower room with waterproof walls and floor, which allows showering without crossing a threshold

3.26 wholesome water

water suitable for human consumption and/or domestic purposes meeting specific minimum requirements

NOTE 1 Attention is drawn to the Water Quality Regulations ([9] to [16]) in respect of the minimum requirements for wholesome water.

NOTE 2 Wholesome water is often referred to as potable water.

Section 2: General recommendations for selection, installation and maintenance

4 General recommendations for sanitary and associated appliances

4.1 General

- 4.1.1** Appliances should be selected and installed to suit the space, water supply and drainage available, and to provide access to enable maintenance and subsequent disconnection for maintenance or replacement.

NOTE Recommendations for water supply and drainage are given in [4.7](#) and [4.8](#) respectively.

- 4.1.2** The minimum number of appliances should be determined in accordance with [BS 6465-1](#).

- 4.1.3** The dimensions of the space to accommodate and use the appliances should be determined in accordance with [BS 6465-2](#).

4.2 Durability of sanitary and associated appliances

- 4.2.1** Appliances and their associated plumbing should be sufficiently robust and durable for the intended use to avoid breakage and failure in service.

- 4.2.2** Vandal-resistant appliances should be provided where appropriate in public toilets or other situations where the appliances might be subject to rough usage or vandalism.

NOTE Further guidance is given in [BS 6465-4](#).

4.3 Space heating devices and other internal environmental controls

- 4.3.1** In any room, or building, that contains sanitary appliances, air temperature, air quality and levels of lighting should be appropriate for the location.

NOTE Further guidance is given in [BS 6465-1](#).

- 4.3.2** Radiators should not be located close to urinals, as splashing can lead to odours and damage to the surface of the radiator.

- 4.3.3** Radiators should not be located close to sanitary appliances due to the danger of contact of bare skin with hot surfaces.

- 4.3.4** Although radiators can be incorporated into bath panels, conventional radiators should not be installed against a bath.

- 4.3.5** Where underfloor heating is to be used, it should not be laid beneath appliances, especially those with cabinets or panels.

NOTE 1 If underfloor heating devices are laid beneath appliances, this can damage the pipes or cables as well as the appliances, and can prevent the heating from working effectively. It can also raise the temperature of unoccupied spaces and hence heat the cold water supply.

NOTE 2 Underfloor heating devices include electric mesh or panels as well as piped liquid systems. As underfloor heating is normally at a lower temperature than conventional radiators, electric towel rails might also be needed.

4.4 Marking on controls for appliances

Controls for the intended operation and use of appliances should be clearly and indelibly marked on the appliances.

NOTE Controls could include temperature, flow, operational and flush controls. The markings could include the use of symbols.

Where controls for isolation and servicing are not located adjacent to the appliance or fitting, they should be readily identifiable and accessible.

4.5 Facilities for disabled and elderly people

4.5.1 Sanitary and associated appliances for disabled people should be selected and installed in accordance with [BS 8300-2](#).

NOTE Attention is drawn to the following documents, which give requirements and recommendations for the provision of toilets, baths and showers for disabled people:

- The Building Regulations 2010 – Approved Document M [[18](#)], for England and Wales;
- The Scottish Building Standards Technical Handbook – Non-domestic – Section 3 [[19](#)] and The Scottish Building Standards Technical Handbook – Domestic – Section 3 [[20](#)], for Scotland;
- The Building Regulations (Northern Ireland) 2012 – Technical Booklet R [[21](#)], for Northern Ireland.

Attention is also drawn to the Equality Act 2010 [[22](#)].

4.5.2 The needs of elderly people should be taken into account when designing sanitary accommodation.

NOTE The number of elderly people in Britain is increasing yearly, and it is expected that 25% of people will be over 65 in 2037, compared to 18% in 2019. Elderly people are often not disabled, but have decreasing strength and agility, and it is essential that their homes and other facilities help support them in leading an independent life for as long as possible. Future adaptability needs to be considered. For example, many elderly people cannot use a bath or stand-up shower. If a bath is provided, it can be replaced with a sit-down shower if the need arises. There might not be space for this if only a stand-up shower is provided, which might result in the person having to move home or go into care.

4.5.3 The possible future need for grab-rails and other aids in sanitary accommodation should be taken into account, and walls should be suitable to accommodate these.

4.6 Sustainability

NOTE Guidance on material efficiency is given in the BS 8895 series.

4.6.1 Sustainability should be taken into account in the selection of appliances. When carrying out work on existing installations, it should be determined whether appliances can be retained or reused. New appliances should be selected to be suitable for the application for which they are to be used (e.g. domestic or commercial), such that they do not require regular repair or replacement. There should be easy access to any components which require periodic maintenance or replacement.

4.6.2 It should be determined whether off-site construction would be more sustainable in avoiding site wastage during construction.

4.6.3 Where a facilities manager for the building is available, they should be consulted to identify from maintenance records and experience, any problems they have with current appliances, and to determine whether these problems can be designed out.

4.7 Water supply

4.7.1 Modifications to existing systems

Where appliances are being added to an existing system, it should be verified that the existing water supply and drainage has sufficient capacity to accommodate the additional demand. Particular attention should be given to the hot water system to ensure it can serve all appliances that are likely to be used at the same time.

4.7.2 Efficient use of water

COMMENTARY ON 4.7.2

All users are being encouraged to avoid waste and minimize their water consumption.

Building Regulations ([5] to [8]) give consumption performance requirements for some types of premises. The flow rates of sanitary tapware, shower fittings, etc., are often controlled through the use of flow regulators, which can be built into the appliance, attached to the outlet or provided on the upstream pipework to the outlet fitting.

The selection of products and specifications needs to take account of factors such as the type of water system (in particular pressure) and the optimal level of flow or volume required, ensuring that function and user experience are maintained whilst reducing the amount of water used for a particular activity.

However, when retrofitting water-efficient products during refurbishments, or to an existing system, a full water system assessment might be required. This is to ensure that the effect on the water system does not result in the water system being oversized, which could impact on water quality and the health of users. It might be necessary to resize some parts of the system to maintain water safety within the system. For example, if pipes are oversized, water turnover is reduced, which could lead to an increase in temperature gain or loss, and/or allow water to become stagnant.

In some cases where water is not required to be wholesome, consumption can be offset by utilizing non-wholesome sources such as water reuse (see 4.7.4).

Water efficiency should be taken into account in the selection of appliances.

4.7.3 Water management

In complex systems or public environments, a water management system should be used to monitor and control the water system. Where a building management system is also provided, the water management system should be linked to it.

NOTE Although conventional stand-alone fittings might be appropriate in most small buildings, the selection and installation of intelligent fittings that use electronics to provide data could be considered. This could be a water management system, building management system or a simple data recorder, which can aid maintenance and Legionella risk reduction. In addition to fittings usage data, some systems also incorporate leak detection units and water supply shut-off functions.

4.7.4 Water reuse

COMMENTARY ON 4.7.4

In some cases where water is not required to be wholesome, such as for irrigation use, consumption can be offset by utilizing non-wholesome sources such as rainwater or greywater reuse. Such systems can vary considerably in complexity, treatment and applicability; hence care is needed before specifying them for use.

Attention is drawn to the Water Fittings Regulations ([2], [3], [4]), which require advance notification to the local water undertaker relating to proposed work before it is commenced. More details about notification requirements can be found on the WRAS website (www.wras.co.uk/notification/).

4.7.4.1 Rainwater reuse systems should be designed and installed in accordance with BS EN 16941-1.

4.7.4.2 Greywater reuse application should be designed and installed in accordance with [BS 8525-1](#) and greywater treatment equipment should conform to [BS 8525-2](#).

4.7.5 Water softeners

COMMENTARY ON 4.7.5

Water softeners in hard water areas can help reduce scale build-up within water systems and minimize deposits (e.g. limescale) on outlets, sinks, basins, etc., and can extend the life of appliances. They also reduce the need for soaps and detergents.

Attention is drawn to the Water Fittings Regulations ([2], [3], [4]) in respect of the requirement for wholesome water to be supplied to any place where drinking water is drawn off or to any sink provided in an area where food is prepared.

The use of a water softener can result in softened wholesome water, which is wholesome water with a slightly higher sodium (salt) content. As all babies and some adults have an intolerance to sodium in water, softened wholesome water cannot be used as drinking water or in a cold water tap in a food preparation area, but can be used for washing, bathing and sanitary use.

Guidance on installation is given in WRAS Information Guidance Note 9-07-01 [23].

Where water softeners are used, they should meet the requirements specified in BS EN 14743.

4.7.6 Legionella control

COMMENTARY ON 4.7.6

In all water supply systems, there is a risk of pathogen proliferation, which can be minimized by good design and water quality control. The normal route is to use temperature to minimize risk by keeping cold water below 20 °C and storing hot water above 60 °C while delivering it at around 50 °C. Some outlet fittings might require a high temperature periodic flush to sanitize them. Such procedures can be carried out manually or automatically using a suitable water management system.

4.7.6.1 Legionella and other water-borne pathogens can cause serious illnesses, and appliances should be positioned and installed in such a way as to reduce the risk.

4.7.6.2 The following factors should be minimized in water system designs:

- deadlegs;
- little-used outlets;
- close proximity of hot and cold water pipes;
- uninsulated pipework;
- oversized storage vessels;
- stagnant water; and
- use of inappropriate materials in contact with water.

4.7.6.3 Appropriate measures for the installation type and likely users of the system should be incorporated in any water system design. Those people with reduced immune systems are more vulnerable to Legionella infection, so more stringent measures should be taken in installations in care homes and similar situations.

NOTE Full procedures and guidance on Legionella control can be obtained from [BS 8580-1](#) and HSE publication HSG 274, Part 2 [24].

4.8 Drainage

If appliances are located where conventional gravity drainage would be impracticable, alternative drainage options, as described in [Table 1](#), should be evaluated and an appropriate option selected.

NOTE The standards referenced in [Table 1](#) might provide additional information as well as specifications and requirements that are outside of the application of this part of BS 6465. The cost of an installation varies by site and complexity; generally, the more equipment that is required and the greater the space needs, the greater the costs. Running costs of most drainage systems are low, but pump servicing can be inconvenient and costly.

Table 1 — *Drainage options*

Drainage option	Advantages	Disadvantages	Relevant standards
Gravity	Conventional piped system with no energy requirements. Readily available and acceptable to most regulators.	Large bore pipes need to be laid at a gradient with minimal bends.	Additional information is given in BS EN 12056 (all parts) and BS EN 752.
Pumped (pressure)	Can accommodate wastewater from a range of appliances and discharge set volumes to a drain or sewer at higher level.	Needs a power supply and space for the chamber, pumps, valves and pipework. Can be noisy.	Additional information is given in BS EN 16932-1 , BS EN 16932-2 and BS EN 12056-4.
Pumped (vacuum)	Uses small bore pipes (typically 50 mm) for collecting discharges from appliances and interface valves. Pipes run in a sawtooth profile and can discharge upwards. If used with vacuum toilets, water consumption is reduced, and ventilation is added via the appliance.	Needs an energy supply and space for the collection and vacuum generation equipment. Produces a different noise to gravity systems.	Additional information is given in BS EN 16932-3 and BS EN 12109.
Small-bore pumped discharge	Easy to fit behind conventional WCs or in cupboards. Can serve a WC, sink, etc., or a group of appliances (depending upon model). Uses very small bore pipes (typically 22 mm) and can discharge upwards or through numerous bends horizontally, or both.	Needs an energy supply and space. Limited discharge capacity and frequency of use. In the UK, Building Regulations ([5] to [8]) normally also require a gravity-drained WC to be available.	Additional information is given in BS EN 12050-3.
No drainage	If a system is used that requires no drainage, pipework can be eliminated, and the utilization of any resources (normally considered to be waste products) can be maximized.	If a system is used that requires no drainage, such as a packaging, composting or combustion toilet, there are additional energy requirements and consumables. Autonomous systems, as well as some composting options, can require large space volumes. Building Regulations ([5] to [8]) might limit the options.	Guidance on the performance of non-sewered sanitation systems (NSSS) is given in BS ISO 30500.

Section 3: Selection of sanitary and associated appliances

5 General recommendations for selection

Individual types of appliances should be selected in accordance with the recommendations given in [Clause 6](#) to [Clause 15](#).

NOTE Attention is drawn to the Water Fittings Regulations ([2], [3], [4]) in respect of baths (see 11.2), sinks (see Clause 8), washbasins (see Clause 10) or similar appliances which require a plug. A plug is not required where a spray tap is provided, or, in the case of washbasins or washing troughs, where a self-closing tap or an outlet delivering water at a rate not exceeding 3.6 l/m is provided.

6 Sanitary taps

COMMENTARY ON CLAUSE 6

As well as standard tap fittings, fittings to facilitate personal hygiene, e.g. ablution sprays, douches and spray WC seats, are becoming more popular, and are often required by specific social groups or people with disabilities. Careful selection of appropriate fittings is essential, as they often require special backflow protection provisions to ensure compliance with the Water Fittings Regulations ([2], [3], [4]). This could prohibit direct mains connection, as ablution sprays or douches require backflow protection to the highest level (fluid category 5), which requires physical separation, by way of an air gap, of the upstream supply. These are not always readily accommodated in all water supply systems. Further guidance relating to air gaps is given in the Commentary on 16.4.

6.1 General recommendations for taps

- 6.1.1** Taps and other sanitary outlets should be selected for their intended purpose, and for the type of water supply system to which they are to be connected. The system's operating pressure, flow rates, water quality, etc., should be taken into account.
- 6.1.2** Sanitary taps should conform to one of the following standards or a recognized alternative (see Note 1).
- Spray taps should conform to [BS 5388](#) or [BS 5779](#).
 - Thermostatic mixing valves should conform to BS EN 1111 or BS EN 1287.
 - Mechanical (non-thermostatic) mixing valves should conform to BS EN 1286 or BS EN 817.
 - Shower hoses for sanitary tapware should conform to BS EN 1112, BS EN 1113, or BS EN 16146.
 - Electronic opening and closing sanitary tapware should conform to BS EN 15091.
 - Single taps and mixer taps should conform to BS EN 200.
 - Taps with automatic shut-off valves should conform to BS EN 816.
 - Extractable outlets for showers, sinks or basin mixers should conform to BS EN 16145 or BS EN 16146.
 - All sanitary taps which incorporate non-metallic materials should also conform to [BS 6920-1](#).

NOTE 1 Test methods for non-metallic materials are given in the other parts of [BS 6920](#).

NOTE 2 The Water Fittings Regulations ([2], [3], [4]) recognize appropriate British Standards, CE marking to a harmonized standard, or the UK's Regulator's Specifications.

NOTE 3 It is expected that packaging or product information will include the manufacturer's statement(s) of compliance with UK legislation, such as "compliance with Water Fittings Regulations" or an appropriate UK approval mark. Users of this British Standard are advised to consider the desirability of selecting products that have appropriate third-party certification of conformity to the relevant UK requirements.

- 6.1.3** The water spouts of taps should be positioned such that water enters the appliance, and does not spill or splash onto adjoining areas, whilst not impeding the use of the appliance (e.g. when people hold their hands beneath the taps), and maintaining the air gap (see [16.4](#)).

6.2 Mixer taps

COMMENTARY ON 6.2

Mixer taps generally come in three forms.

- a) The hot and cold supplies are kept separate until the point of discharge (see [Figure 1](#)) and the water then mixes in atmosphere. These are sometimes referred to as bi-flow taps.*
- b) The hot and cold supplies are mixed before the point of discharge (see [Figure 2](#)). This could be within the tap body or in the spout.*
- c) The hot and cold supplies are mixed within the body of the tap by means of a thermostatic temperature limiting cartridge before the point of discharge.*

Typically, mixer taps are of the "mix in the body" type [see item b) and c) above], and usually have a minimum operating pressure requirement of at least 100 kPa (1 bar) pressure. In water systems where the pressure of the hot and cold water supplies is unequal, additional measures need to be undertaken to ensure that the hot water cannot inadvertently flow up the cold pipework or vice versa (known as backflow). The most common method to prevent backflow from occurring is to install a single check valve on the hot and cold water supplies to the tap. However, caution is needed as check valves rely on springs to function correctly. Where the water pressure is low, there might be insufficient pressure for water to flow through the check valve to the tap, e.g. where the supplies are fed from a cistern close to the tap, less than 10 m above the tap, or the mains pressure is less than 100 kPa (1 bar).

Where the pressure is low it is recommended to use either taps with separate pathways up to the point of discharge [see item a) above], or separate hot and cold taps.

Further guidance on bi-flow taps is available at https://www.wras.co.uk/consumers/resources/interpretations_and_advice/installation/i43/.

- 6.2.1** Hot and cold mixer taps should be selected to be appropriate for the type of water supply system that is available.
- 6.2.2** Where water mixes in the body or spout, appropriate backflow protection should be provided.

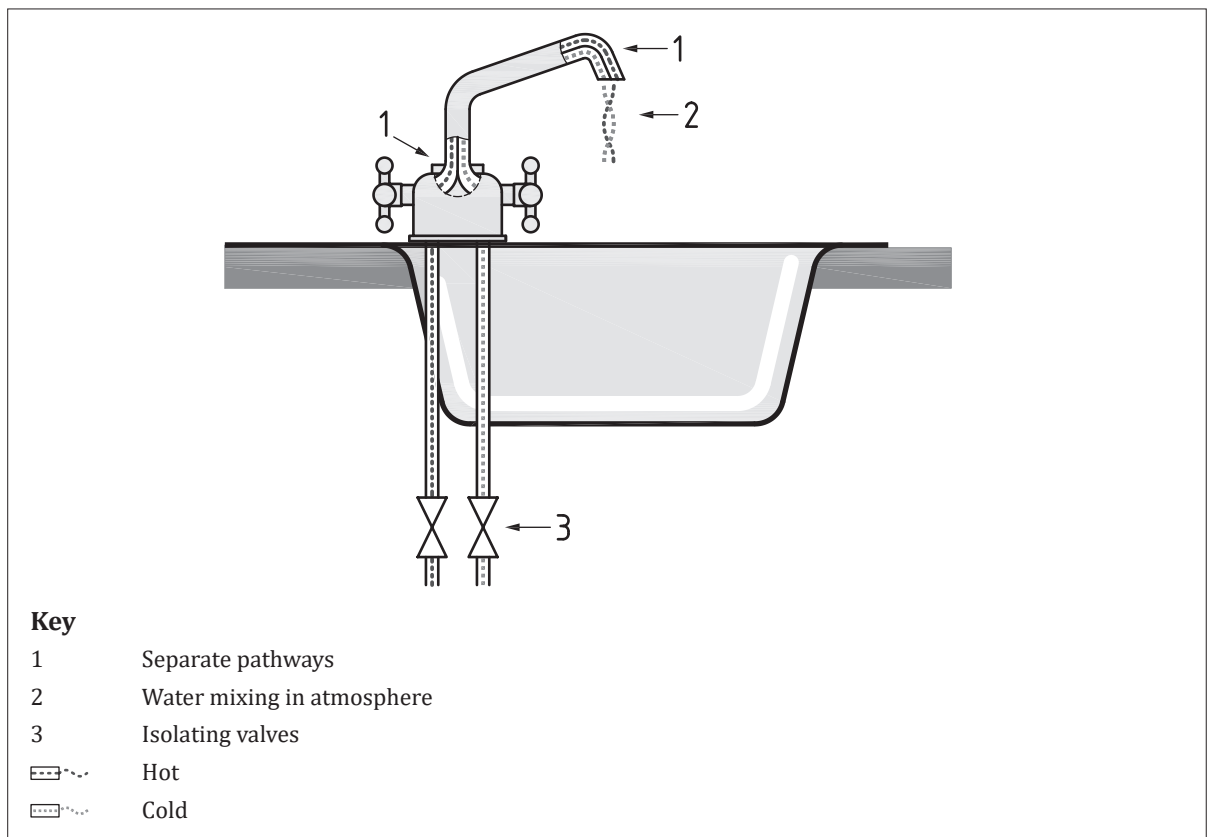
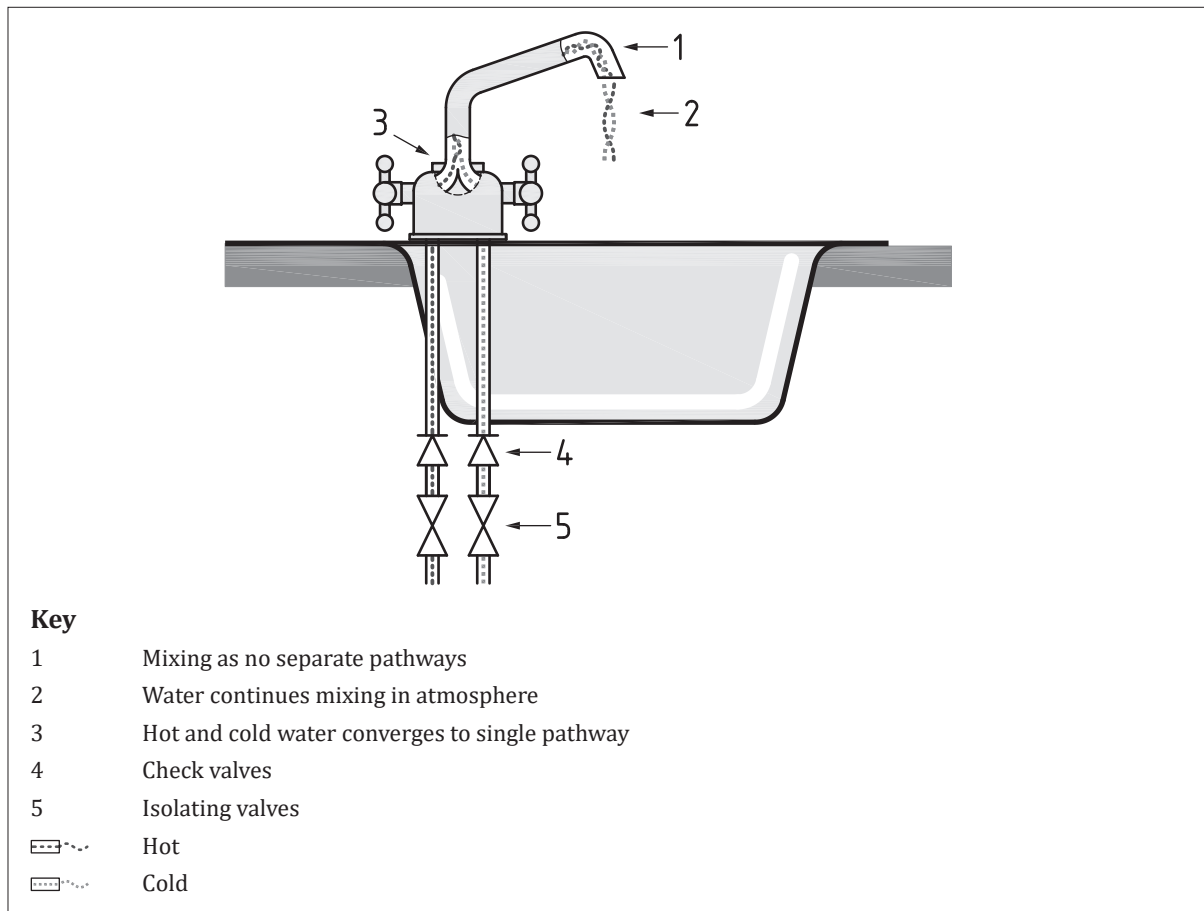
Figure 1 — Tap with separate water pathways within the tap to the point of discharge

Figure 2 — Tap with no separate water pathways within the spout where hot and cold water are mixed within the tap's body prior to discharge



7 Selection of drinking water facilities

7.1 Free-of-charge drinking water should be generally available to the public for health reasons.

NOTE 1 Free-of-charge drinking water is required by law in some types of buildings, e.g. schools and workplaces.

NOTE 2 A large variety of drinking water facilities are available for installation in commercial and industrial buildings, leisure and other locations. These facilities are available in a range of sizes to suit the situation of installation and use.

NOTE 3 A drinking water facility can be:

- a) a mains-fed tap with a wholesome supply, with drainage facility below;
- b) a mains-fed water cooler;
- c) a bottle-fed water cooler;
- d) a mains-fed water bottle filler;
- e) a cup filling water dispenser providing hot (85 °C) and/or cold (10 °C) water;
- f) a fridge water dispenser; or
- g) a drinking water fountain.

7.2 The type of drinking water facility should be selected according to its intended use.

- 7.3** On a drinking water fountain, the jet nozzle should be at least 25 mm above the spill-over level of the bowl and should be shielded in order to protect it from contamination by the mouth of users.

NOTE Drinking fountains can be wall- or floor-mounted according to their location.

8 Selection of sinks and drainers

8.1 General recommendations for sinks and drainers

- 8.1.1** Domestic sinks should be fitted with a drainer or drainers, which should be integral with the sink where practicable. Certain types of sinks, including combination sinks, are not reversible, and the required layout (i.e. bowl/drainers to the right- or left-hand side for right- or left-handed use) should be determined before ordering.
- 8.1.2** Sinks and drainers made from glazed fireclay should conform to [BS 1206](#) and/or BS EN 13310.

8.2 Sinks

- 8.2.1** The type and size of sink to be installed should be selected according to its intended use as given in [Table 2](#).

NOTE The size of the bowl(s) is important where large items of kitchen equipment are to be washed.

- 8.2.2** Sinks made from enamelled steel, enamelled cast iron, stainless steel and synthetic materials should conform to BS EN 13310.
- 8.2.3** Connecting dimensions for kitchen sinks should be in accordance with BS EN 695.

8.3 Drainers

Drainers should be designed to direct water freely into the sink. There should be raised edges on three sides to prevent spillage.