HM Government

The Building Regulations 2010

Sanitation, hot water safety and water efficiency

G

APPROVED DOCUMENT

Requirement G1: Cold water supply

Requirement G2: Water efficiency

Requirement G3: Hot water supply and systems

Requirement G4: Sanitary conveniences and washing facilities

Requirement G5: Bathrooms

Requirement G6: Food preparation areas

Regulation: 36

Water efficiency calculator for new dwellings

2025 edition – for use in England

DRAFT VERSION

Main changes in the 2025 edition

This approved document supports regulation 36 and Part G of Schedule 1 to the Building Regulations 2010.

This approved document takes effect on <date> for use in England. The 2015 edition, as amended, will continue to apply in relation to building work on a particular building where a building notice, an initial notice or an application for building control approval with full plans, has been given to the relevant authority in respect of that building before the day the new regulations come into force, <date>, and either the building work to which it relates:

a. has started and is sufficiently progressed before that day; or

b. is started and is sufficiently progressed within the period of six months beginning on that day.

Please note that 'building notice', 'initial notice' and 'building control approval application with full plans' have the meanings given in the Building Regulations 2010. For the purpose of these transitional arrangements, building work is to be regarded as 'sufficiently progressed':

a. where the building work consists of the construction of a building, when the pouring of concrete for the permanent placement of the trench, pad or raft foundations has started, or the permanent placement of piling has started;

b. where the building work consists of work to an existing building, when that work has started; or

c. where the building work consists of a material change of use of a building, when work to effect that change of use has stated.

Introduction

What is an approved document?

Approved documents are approved by the Secretary of State and give practical guidance on common building situations about how to meet the requirements of the Building Regulations 2010 for England. Different approved documents give guidance on each of the technical parts of the regulations. These are all listed in the back of the approved documents. In addition to guidance, some approved documents include provisions that must be followed exactly, as required by regulations or where methods of test or calculation are approved by the Secretary of State.

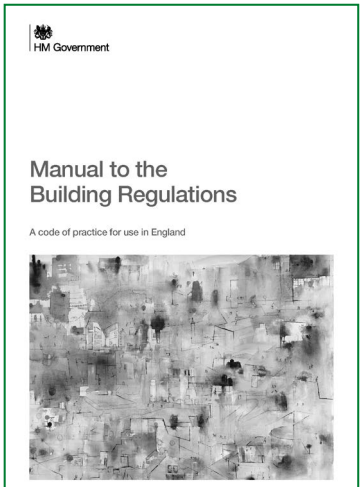
Each approved document covers the requirements of the Building Regulations 2010 relating to a different aspect of *building work*. *Building work* must also comply with all other applicable requirements of the Building Regulations 2010 and all other applicable legislation.

How is construction regulated in England?

Most *building work* being carried out in England must comply with the Building Regulations 2010. The Building Regulations are made under powers in the Building Act 1984.

Building Regulations protect the health and safety of people in and around buildings, they also provide for energy and water conservation and access to and use of buildings.

The *Manual to the Building Regulations* (references to this in the introduction are taken from the first edition) gives an overview of the building regulatory system in England. You can access the most recent version of the manual at: www.gov.uk/guidance/building-regulations-and-approved-documents-index.



How do you comply with the Building Regulations?

Building work must meet all relevant requirements of the Building Regulations. To comply with the Building Regulations, it is necessary both to follow the correct procedures and meet technical performance requirements.

The approved documents set out what, in ordinary circumstances, may be accepted as one way to comply with the Building Regulations. Note, however, that:

- Complying with the guidance in the approved documents does not guarantee that *building work* complies with the requirements of the regulations – the approved documents cannot cover all circumstances. Those responsible for *building work* must consider whether following the guidance in the approved documents is likely to meet the requirements in the particular circumstances of their case.
- There may be other ways to comply with the requirements than those described in an approved document. If those responsible for meeting the requirements prefer to meet a requirement in some other way than described in an approved document, they should seek to agree this with the relevant building control body at an early stage.

DRAFT VERSION

Those responsible for *building work* include agents, designers, builders, installers and the building owner. For further information, see Chapter 7 in Volume 1 and paragraphs A26, B2 and F2 in Volume 2 of the *Manual to the Building Regulations*.

The Building Regulations can be contravened by not following the correct procedures or not meeting the technical performance requirements. If the building owner or those responsible for the works contravene the Building Regulations, the local authority may prosecute them in the magistrates' court. For further information on enforcement and sanctions in the existing system, see Chapter B in Volume 2 of the *Manual to the Building Regulations*.

What do the Building Regulations cover?

'*Building work*' is a legal term for work covered by the Building Regulations. Where a building is not exempt, the Building Regulations apply to all types of *building work* as defined in regulation 3 of the Building Regulations. For further information, what constitutes *building work* is covered in Chapter A, Volume 2 of the *Manual to the Building Regulations*.

The Building Regulations contain sections dealing with definitions, procedures and the expected technical performance of *building work*. For example, the Building Regulations:

a. define what types of building, plumbing and heating work is classed as *building work* in regulation 3 (for further information see paragraphs A14 to A16 in Volume 2 of the *Manual to the Building Regulations*).

b. specify types of building that are exempt from the Building Regulations (for further information see Table A1 and paragraph A11 in Volume 2 of the *Manual to the Building Regulations*).

c. set out the notification procedures to follow when undertaking *building work* (for further information see Figure 2.1 in Volume 1 of the *Manual to the Building Regulations*).

d. set out the technical requirements (see Table 7.1 in Volume 1 of the *Manual to the Building Regulations*) with which the individual aspects of building design and construction must comply in the interests of the health and safety of building users, of energy efficiency (for further information see paragraphs A12(d)–(f), A14(f)–(h), A22, A23, B2(c) and F24 in Volume 2 of the *Manual to the Building Regulations*), and of access to and use of buildings.

e. set out the standards for building materials and workmanship in carrying out *building work* (for further information see Chapter 7 in Volume 1, and paragraphs F8 to F11 in Volume 2 of the *Manual to the Building Regulations*).

When must a building control body be notified?

It is often necessary to notify a building control body of planned *building work*. To help ensure that work complies with the Building Regulations, those responsible for *building work* may need to use one of the two types of building control body listed below:

a. a local authority building control body

b. an approved inspector.

If *building work* consists only of installing certain types of services or fittings (e.g. fuel-burning appliances or replacement windows) and the building owner employs an installer that is registered with a relevant competent person scheme designated in the regulations, a building control body does not need to be notified.

Who oversees higher-risk buildings?

The new building control process for higher-risk buildings in England came into force on 1 October 2023. From this date the building control authority for higher-risk buildings is the Building Safety Regulator. Any new building work in-scope of the higher-risk regime can no longer be overseen by local authority or private sector building control.

The Building Safety Regulator will be the building control authority for higher-risk buildings, in particular:

- the construction of a new higher-risk building
- building work to an existing higher-risk building
- any work that causes a non-higher-risk building to become a higher-risk building, including material change of use
- any work relating to a higher-risk building that causes it to cease to be such a building.

From 1 October 2023, you must send a building control approval application to the Regulator following the process outlined in the Building (Higher-Risk Buildings Procedures) (England) Regulations 2023.

As outlined above, the definition of higher-risk building for the design and construction part of the higher-risk regime is provided by section 120D of the Building Act 1984 and the Higher-Risk Building (Descriptions and Supplementary Provisions) Regulations 2023.

Guidance is being produced to support understanding of the definition of higher-risk building. See the Guidance on the criteria for being a higher-risk building: https://www.gov.uk/government/collections/guidance-on-the-criteria-for-being-a-higher-risk-building.

How to use this approved document

Each approved document contains:

- general guidance on the performance expected of materials and *building work* in order to comply with each of the requirements of the Building Regulations, and
- practical examples and solutions on how to achieve compliance for some of the more common building situations.

They may not provide appropriate guidance if the case is unusual in terms of its design, setting, use, scale or technology. Non-standard conditions may include any of the following:

- difficult ground conditions
- buildings with unusual occupancies or high levels of complexity
- very large or very tall buildings
- large timber buildings
- some buildings that incorporate modern construction methods.

DRAFT VERSION

Anyone using the approved documents should have sufficient knowledge and skills to understand the guidance and correctly apply it to the *building work*. This is important because simply following the guidance does not guarantee that your *building work* will comply with the legal requirements of the Building Regulations. Each approved document contains legal requirements (which you must follow) and guidance (which you may or may not choose to follow). The text in a box with a green background at the beginning of each section of an approved document is taken from the Building Regulations. This text sets out the legal requirements.

The explanation which follows the legal requirements is guidance (see Diagram *i* below). The guidance then explains one or more ways to demonstrate how *building work* can be shown to comply with the legal requirements in common circumstances. The terms in green lettering in an approved document are key terms, listed and explained in the appendix to that approved document. Guidance in the approved documents addresses most, but not all, situations that building owners will face. Situations may arise that are not covered. You or your advisers will need to carefully consider whether following the guidance will mean that the requirements of the Building Regulations will be met.

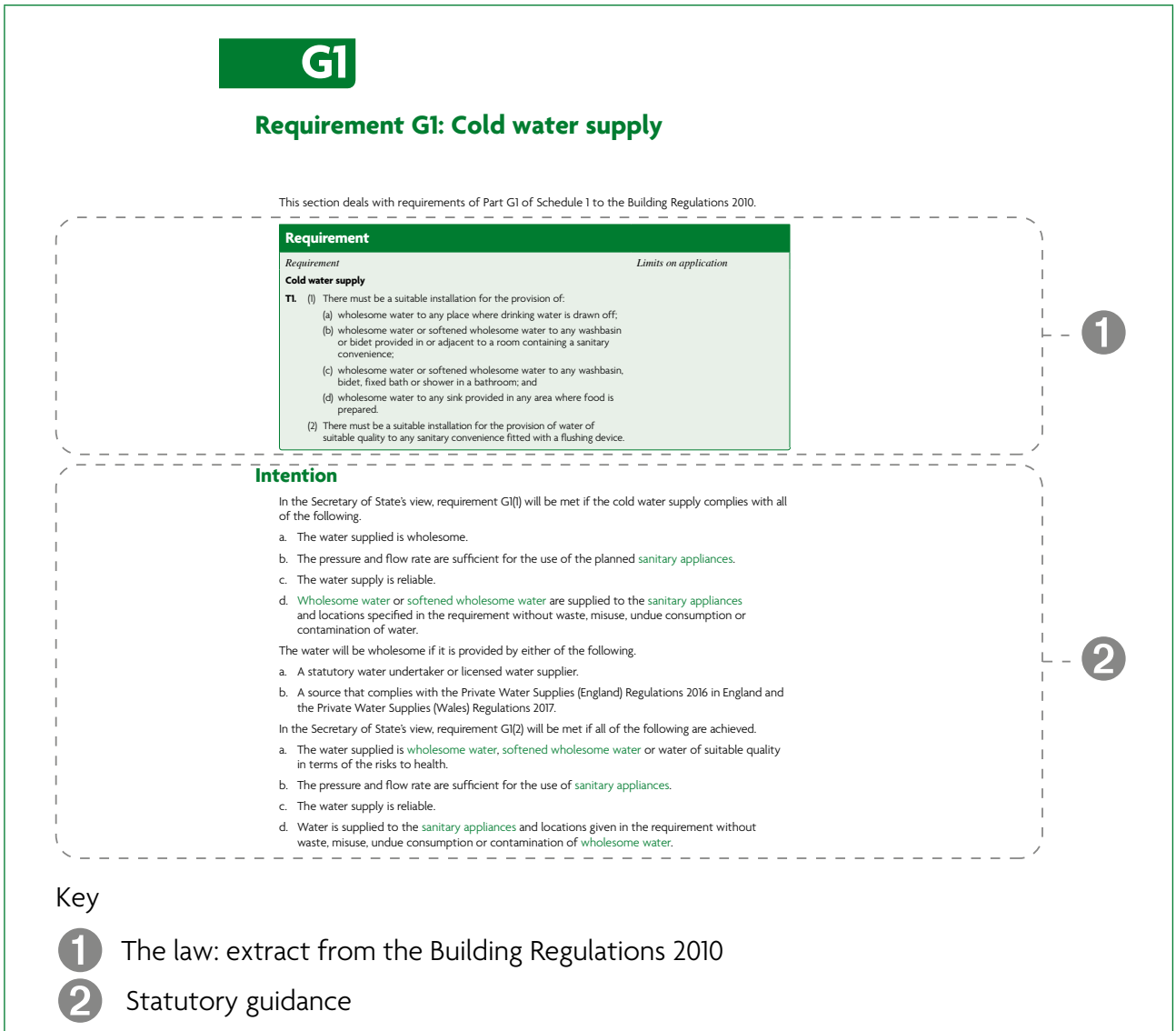


Diagram *i* The relationship between regulations and guidance in the approved documents

DRAFT VERSION

For further information about the use of technical guidance, see Chapter 7 in Volume 1 and Chapter F in Volume 2 of the *Manual to the Building Regulations*.

Where to get further help

If you are unsure whether you have the knowledge and skills to apply the guidance correctly, or if you do not understand the technical guidance or other information in this approved document or the additional detailed technical references to which it directs you, you should seek further help. Some sources of help are listed below.

a. Your building control body may be able to help in many cases.

b. If you are registered with a competent person scheme, the scheme operator should be in a position to help.

c. Suitably qualified and experienced construction professionals should also be engaged where necessary.

Contents

Section 0: Introduction

Summary

0.1 This approved document is Approved Document G. It deals with sanitation, hot water safety and water efficiency requirements, giving guidance on how to comply with Part G of Schedule 1 to the Building Regulations. It is published in one volume and deals with buildings that are dwellings and buildings other than dwellings.

0.2 This approved document contains the following sections.

Approved document section	Related Building Regulations requirements
Section 0: Introduction	n/a
Section 1: Cold water supply	Requirement G1
Section 2: Water efficiency	Requirement G2 and regulation 36
Section 3: Hot water supply and systems	Requirement G3
Section 4: Sanitary conveniences and washing facilities	Requirement G4
Section 5: Bathrooms	Requirement G5
Section 6: Food preparation areas	Requirement G6
Appendix A: Key terms	n/a
Appendix B: Water efficiency calculator for new dwellings	Requirement G2 and regulation 36
Appendix C: Wholesome water	Requirement G1
Appendix D: Standards referred to	n/a
Appendix E: Documents referred to	n/a

Selected key interactions with other parts of the Building Regulations

0.3 In relation to the installation of new and replacement sanitation and hot water services, building work must satisfy all the technical requirements set out in Schedule 1 of the Building Regulations, in particular:

a. Part A (Structure)

b. Part B (Fire safety)

c. Part C (Site preparation and resistance to contaminants and moisture)

d. Part J (Combustion appliances and fuel storage systems)

e. Part L (Conservation of fuel and power)

f. Part P (Electrical safety).

DRAFT VERSION

Limitation on requirements

0.4 In accordance with regulation 8 of the Building Regulations, the requirements in Parts A to D, F to K and P (except for paragraphs G2, H2 and J7) of Schedule 1 to the Building Regulations do not require anything to be done except for the purpose of securing reasonable standards of health and safety for persons in or about buildings (and any others who may be affected by buildings or matters connected with buildings).

0.5 Paragraph G2 is excluded from regulation 8 as it deals with the conservation of water. Paragraphs H2 and J7 are excluded from regulation 8 because they deal directly with prevention of the contamination of water and of oil pollution. Parts E and M (which deal, respectively, with resistance to the passage of sound, and access to and use of buildings) are excluded from regulation 8 because they address the welfare and convenience of building users. Part L is excluded from regulation 8 because it addresses the conservation of fuel and power. All these matters are amongst the purposes, other than health and safety, that may be addressed by Building Regulations.

Types of work covered by this approved document

Building work

0.6 Regulation 3 of the Building Regulations defines building work to include any the following.

a. Erecting or extending a building.

b. Providing or extending a controlled service or fitting.

c. Making a material alteration to a building or to a controlled service or fitting.

0.7 The Building Regulations may also apply if there is a material change of use of a building or part of a building.

0.8 Regulation 4 of the Building Regulations requires that when building work is completed both of the following will apply.

a. The building should comply with all applicable parts of Schedule 1 to the Building Regulations.

b. For an extension or material alteration of a building, or the provision, extension or material alteration of a controlled service or fitting, where it did not comply with any such requirement, it should be no more unsatisfactory in relation to that requirement than before the work was carried out.

0.9 Part G of Schedule 1 to the Building Regulations concerns building work to provide or extend controlled services or fittings. Such building work may also be subject to other parts of the Building Regulations.

Material change of use

0.10 Regulation 5 of the Building Regulations defines material changes of use as any of the following.

a. A building is used as a dwelling where previously it was not.

b. A building contains a flat where previously it did not.

c. A building is used as a hotel or boarding house where previously it was not.

d. A building is used as an institution where previously it was not.

e. A building is used as a public building where previously it was not.

f. A building no longer comes within the exemptions in Schedule 2 to the Building Regulations where previously it did.

DRAFT VERSION

g. A building which contains at least one dwelling contains a greater or lesser number of dwellings than it did previously.

h. A building contains a room for residential purposes where previously it did not.

i. A building which contains at least one room for residential purposes contains more or fewer such rooms than it did previously.

j. A building is used as a shop where previously it was not.

0.11 Where there is a material change of use, the Building Regulations set requirements that must be met before the building can be used for its new purpose.

0.12 Parts G1, G3(1) to (3) and G4 to G6 apply to all the material changes of use mentioned above. Parts G2, G3(4) and regulation 36 apply only to material changes of use where either of the following applies.

a. A building is used as a dwelling where previously it was not.

b. A building contains a flat where previously it did not.

Historic buildings

0.13 Building work covered by this approved document includes work on historic buildings. Historic buildings include the following.

a. Listed buildings.

b. Buildings in conservation areas.

c. Buildings of architectural or historic interest which are referred to as a material consideration in a local authority's development plan.

d. Buildings of architectural and historical interest within national parks, areas of outstanding or natural beauty, and/or world heritage sites.

0.14 During building work, the aim should be to improve sanitation and hot water safety but not harm the character of the building or increase the risk of long-term deterioration to the building's fabric or fittings.

0.15 To balance the need to conserve a historic building and meet sanitation or hot water safety requirements, consider the advice of the local authority's conservation officer before work begins. Guidance is also available online from Historic England (Building Regulations, Approved Documents and Historic Buildings).

NOTE: Any building in the schedule of monuments maintained under section 1 of the Ancient Monuments and Archaeological Areas Act 1979 is exempt from all requirements of the Building Regulations, including those in Part G.

Work which is not notifiable under Schedule 4

0.16 Schedule 4 to the Building Regulations sets out types of work where there is no requirement to notify a building control body that work is to be carried out. These types of work are mainly of a minor nature where there is no significant risk to health, safety, water efficiency or energy efficiency. Health, safety, water efficiency and energy efficiency requirements continue to apply to these types of work; only the need to notify a building control body has been removed.

0.17 Where only non-notifiable work as set out in Schedule 4 is carried out, there is no requirement for a certificate confirming that the work complies with Building Regulations requirements to be given to the occupier or the building control body.

DRAFT VERSION

0.18 The following types of non-notifiable work identified in Schedule 4 are relevant to the sanitation, hot water safety and water efficiency requirements of the Building Regulations.

a. In an existing hot water system, either:

   i. replacing any part which is not a combustion appliance, or

   ii. adding a control device.

   If commissioning is possible, and would affect the use of fuel and power, the building work is notifiable. This is most likely where water heaters are being provided.

b. Installing a single stand-alone, self-contained, fixed hot water appliance and any associated controls. The appliance must not be connected to or part of any other fixed building service.

   If any of the following apply, the building work is notifiable:

   i. the appliance is a combustion appliance

   ii. any electrical work associated with installing the appliance is notifiable

   iii. commissioning is possible and would affect energy efficiency, such as for water heaters

c. Replacing a washbasin, sink, bidet, fixed bath, or shower with one that uses less water.

   Building work that includes any of the following is notifiable:

   i. work on underground drainage

   ii. work on the hot or cold-water system or above-ground drainage which, when complete, might harm the health and safety of any person.

d. Replacing any part of a cold-water supply or adding an output device or control device.

e. Providing a hot water storage system that has a storage vessel of up to 15 litres, but only if any associated electrical work is also not notifiable.

0.19 Schedule 4 also sets out the types of electrical installation work in dwellings that are non-notifiable. Full details are given in Approved Document P.

Exemptions

0.20 Schedule 2 to the Building Regulations sets out classes of buildings exempt from requirements other than some requirements of Part G. Where hot or cold-water supply systems are shared with other buildings, the aim of the requirements is to help ensure that the whole hot or cold-water system is safe.

a. The requirements of Parts G 1, G3(2) and G3(3) apply to any greenhouse which receives a hot or cold-water supply from a source shared with or inside a dwelling.

b. The requirements of Parts G1, G3(2) and G3(3) apply if a building in either of the following classes receives a hot or cold-water supply that is shared with or located inside any building that is subject to the Building Regulations.

   i. Any small, detached building within Class 6 of Schedule 2.

   ii. Any extension within Class 7 of Schedule 2 (which includes conservatories under 30m^2 in area).

Note that the Regulations do not require hot or cold-water systems to be provided in exempt buildings. If, however, such systems are provided, they must meet the hygiene and safety requirements in the parts listed above.

DRAFT VERSION

Materials and workmanship

0.21 Any building work which is subject to the requirements imposed by Schedule 1 to the Building Regulations shall be carried out in accordance with regulation 7. Guidance on meeting these requirements on materials and workmanship is contained in Approved Document 7.

0.22 Building Regulations are made for specific purposes, primarily the health and safety, welfare and convenience of people and for energy conservation. Standards and other technical specifications may provide relevant guidance to the extent that they relate to these considerations. However, they may also address other aspects of performance or matters which, although they relate to health and safety etc., are not covered by the Building Regulations.

0.23 When an approved document refers to a named standard, the relevant version of the standard to which it refers is the one listed at the end of the publication. However, if this version has been revised or updated by the issuing standards body, the new version may be used as a source of guidance provided it continues to address the relevant requirements of the Building Regulations.

Supplementary guidance

0.24 The Government occasionally issues additional material to aid interpretation of the guidance in approved documents. This material may be conveyed in official letters to chief executives of local authorities and Registered Building Control Approvers and/or posted on the websites accessed through: www.gov.uk.

Interaction with other legislation

0.25 This approved document refers to other legislation, including that listed below, which you may also need to consider.

NOTE: All statutory instruments are at www.legislation.gov.uk.

a. The Water Industry Act 1991 and the Water Supply (Water Quality) Regulations 2018 (as amended).

b. The Water Supply (Water Fittings) Regulations 1999 (as amended) are made under the Water Industry Act 1991 and apply to water fittings in premises to which a statutory water undertaker supplies water. They make provision for preventing contamination, waste, misuse, undue consumption and erroneous measurement of water supplied by a statutory water undertaker or licensed water supplier.

c. The Private Water Supplies (England) Regulations 2016 in England and the Private Water Supplies (Wales) Regulations 2017 apply to the quality of water supplied from private supplies for drinking, washing or cooking or for food preparation.

d. The Workplace (Health, Safety and Welfare) Regulations 1992 (as amended) apply to buildings, and to the common parts of flats and similar buildings, where people are employed. The regulations include space requirements and provision of sanitary conveniences.

e. The Food Safety and Hygiene (England) Regulations 2013 and the Food Hygiene Rating (Wales) Regulations 2013 apply to measures relating to food (including drink) including the primary production of food. The provision of wash basins and sinks is relevant to Approved Document G.

f. The Gas Safety (Installation and Use) (Amendment) Regulations 2018 (as amended) relate to dangers of transmitting, distributing, supplying or using gas from a gas storage vessel. Gas heated water systems are relevant to Approved Document G.

DRAFT VERSION

Requirement G1: Cold water supply

This section deals with the requirements of Part G1 of Schedule 1 to the Building Regulations 2010.

Requirement

Requirement	*Limits on application*
Cold water supply	
T1. (1) There must be a suitable installation for the provision of: (a) wholesome water to any place where drinking water is drawn off; (b) wholesome water or softened wholesome water to any washbasin or bidet provided in or adjacent to a room containing a sanitary convenience; (c) wholesome water or softened wholesome water to any washbasin, bidet, fixed bath or shower in a bathroom; and (d) wholesome water to any sink provided in any area where food is prepared. (2) There must be a suitable installation for the provision of water of suitable quality to any sanitary convenience fitted with a flushing device.	

Intention

In the Secretary of State's view, requirement G1(1) will be met if the cold water supply complies with all of the following.

a. The water supplied is wholesome.

b. The pressure and flow rate are sufficient for the use of the planned sanitary appliances.

c. The water supply is reliable.

d. Wholesome water or softened wholesome water are supplied to the sanitary appliances and locations specified in the requirement without waste, misuse, undue consumption or contamination of water.

The water will be wholesome if it is provided by either of the following.

a. A statutory water undertaker or licensed water supplier.

b. A source that complies with the Private Water Supplies (England) Regulations 2016 in England and the Private Water Supplies (Wales) Regulations 2017.

In the Secretary of State's view, requirement G1(2) will be met if all of the following are achieved.

a. The water supplied is wholesome water, softened wholesome water or water of suitable quality in terms of the risks to health.

b. The pressure and flow rate are sufficient for the use of sanitary appliances.

c. The water supply is reliable.

d. Water is supplied to the sanitary appliances and locations given in the requirement without waste, misuse, undue consumption or contamination of wholesome water.

Section 1: Cold water supply

Wholesome water

1.1 Water supplied to a building by a statutory water undertaker or licensed water supplier through an installation that complies with the Water Supply (Water Fittings) Regulations 1999 (SI 1999/1148 as amended) may be assumed to be wholesome water. See Appendix C.

1.2 The Water Supply (Water Fittings) Regulations 1999 (SI 1999/1148 as amended) include regulations to prevent contamination, waste, misuse, undue consumption and inaccurate measurement of water supplied by a water undertaker or licensed water supplier.

1.3 If a supplier other than a water undertaker or licensed water supplier provides water to a building, the water is considered wholesome water if it meets the criteria in the Private Water Supplies (England) Regulations 2016 (SI 2016/618) in England and the Private Water Supplies (Wales) Regulations 2017 (SI 2017/1041). See Appendix C.

Softened wholesome water

1.4 Wholesome water which has been treated with a water softener or water softening processes may have raised levels of sodium.

a. Softened water that complies with the requirements for wholesome water is still considered to be wholesome water.

b. Softened water that complies with the requirements for wholesome water other than its sodium content is softened wholesome softened.

1.5 Softened wholesome water may be suitable for most purposes; however, to any place where drinking water is drawn off or to any sink in a food preparation area, only wholesome water should be provided.

Alternative sources of water

1.6 Alternative sources of water (other than wholesome water) suitable for uses in and about buildings such as to flush toilets and for irrigation include the following.

a. Water from wells, springs, bore-holes or water courses.

b. Harvested rainwater.

c. Reclaimed greywater.

d. Reclaimed industrial process water.

1.7 Systems for water from alternative sources should include measures to minimise the impact on water quality of the following.

a. Failure of any components.

b. Failure to maintain the system.

c. Power failure, where appropriate.

d. Any other measures identified in a risk assessment.

1.8 Guidance on marking pipework for water from alternative sources is given in **BS 1710**, **BS 4800** and **BS 8515**.

1.9 Guidance on installing, modifying and maintaining reclaimed water systems is given in CIBSE's KS1, the Environment Agency's *Harvesting rainwater for domestic uses: an information guide* and **BS 8515**.

1.10 Information on the technical and economic feasibility of rainwater and greywater is given in Waterwise's *Independent Review of the Costs and Benefits of Rainwater Harvesting and Grey Water Recycling Options in the UK*.

1.11 Before water from alternative sources is used in dwellings for sanitary conveniences, washing machines and irrigation, a risk assessment must be carried out to show both of the following.

a. The supply is appropriate to the situation in respect of the source of the water and the treatment of it.

b. The supply is not likely to cause waste, misuse, undue consumption or contamination of wholesome water.

1.12 For any system/unit that supplies dwellings with water from alternative sources, the system designer and manufacturer should do both of the following.

a. Complete a risk assessment which includes the effect on water quality of system failure and failure to maintain the system.

b. Conduct tests to show that any risks have been addressed.

Requirement G2 and regulation 36

This section deals with the requirements of regulation 36 and Part G2 of Schedule 1 to the Building Regulations 2010.

Requirement

Requirement

Water efficiency

G2. Reasonable provision must be made by the installation of fittings and fixed appliances that use water efficiently for the prevention of undue consumption of water.

Water efficiency of new dwellings

36. (1) The potential consumption of wholesome water by persons occupying a new dwelling must not exceed the requirement in paragraph (2).

(2) The requirement referred to in paragraph (1) is either—

(a) 105 litres per person per day; or

(b) in a case to which paragraph (3) applies, the optional requirement of 100 litres per person per day,

as measured in either case in accordance with a methodology approved by the Secretary of State.

(3) This paragraph applies where the planning permission under which the building work is carried out—

(a) specifies the optional requirement in paragraph (2)(b); and

(b) makes it a condition that that requirement must be complied with.

(4) In this Part, "new dwelling" does not include a dwelling that is formed by a material change of use of a building within the meaning of regulation 5(g).

Wholesome water consumption calculation

(1) Where regulation 36 applies, the person carrying out the work must give the local authority a notice which specifies—

(a) which of the requirements in regulation 36(2)(a) or (b) applies to the dwelling; and

(b) the potential consumption of wholesome water per person per day in relation to the completed dwelling.

Building (Approved Inspectors) Regulations 2010

Application of Provisions of the Principal Regulations

20. (1) Regulations 20 (provisions applicable to self-certification schemes), 20A (provisions applicable to third party certification schemes), 25A (consideration of high-efficiency alternative systems for new buildings), 27 (CO2 emission rate calculations), 27A (fabric energy efficiency rate calculations), 27B (fabric performance values calculations), 27C (target primary energy rate calculations for new buildings), 37 (wholesome water consumption calculation), 41 (sound insulation testing), 42 (mechanical ventilation air flow rate testing), 43 (pressure testing), 44 (commissioning) and 44ZA (commissioning in respect of a system for on-site electricity generation) of the Principal Regulations and regulation 7A (energy performance certificates on construction) of the Energy Performance of Buildings (England and Wales) Regulations 2012 apply in relation to building work which is the subject of an initial notice as if references to the local authority were references to the approver.

(4) Regulation 37(2) of the Principal Regulations applies in relation to building work which is the subject of an initial notice as if after "work has been completed" there were inserted, "or, if earlier the date on which in accordance with regulation 17 of the Building (Approved Inspectors etc.) Regulations 2010 the initial notice ceases to be in force".

Limits on application

Requirement G2 applies only when a dwelling is—

(a) erected; or

(b) formed by a material change of use of a building within the meaning of regulation 5(a) or (b).

Intention

In the Secretary of State's view, requirement G2 will be met for new dwellings by achieving all of the following.

a. Cold and hot water systems are designed to consume no more than 105 litres/person/day of wholesome water or the optional standard of 100 litres/person/day (applied by planning condition). The amount of wholesome water should be estimated as set out set out in Appendix B to this approved document; include the use of any alternative sources of water provided in accordance with G1(2)).

b. How the sanitary appliances and white goods, e.g. washing machines and dishwashers, used in the design calculation in paragraph (a) are provided and installed in the dwelling takes account of other paragraphs in this approved document.

c. How any alternative sources of water used in the design calculation in paragraph (a) are supplied to the dwelling takes account of other paragraphs in this approved document.

d. Details are provided of the following inputs to the design calculation in paragraph (a):

   i. the sanitary appliances, washing machines and dishwashers

   ii. the alternative sources of water.

   NOTE: Enough other information should be provided to enable building owners or occupiers to maintain the building and its services and thus maintain the water efficiency of the building.

For a building with more than one dwelling (such as a block of flats), the total amount of wholesome water consumed by the cold and hot water systems for all individual dwellings should be no greater than the potential consumption of wholesome water per person per day in relation to the completed dwelling.

Section 2: Water efficiency

General

2.1 The amount of water used by sanitary appliances and relevant white goods in a new dwelling should be calculated using the manufacturers' declared values.

2.2 The amount of water consumed in a new dwelling should be estimated using the methodology in Appendix B: the water efficiency calculator.

2.3 The amount of wholesome water estimated to be consumed by a new dwelling should not exceed 105 litres/person/day or, where the optional requirement applies, 100 litres/person/day. These amounts include water for outdoor use at 5 litres/person/day.

2.4 Where alternative sources of water (see paragraph 1.6) will be used in the dwelling, this should be included in the estimate of water use.

Fittings approach

2.5 As an alternative to the water efficiency calculator (paragraph 2.2), a fittings approach may be used.

2.6 If the fittings approach is used, the amount of water consumed by the fittings must not exceed the values in Table 2.1. If values exceed those in Table 2.1, the water efficiency calculator must be completed to show the building complies with requirement G2. Where a shower is not to be provided or where a waste disposal unit, a water softener or water re-use is to be provided the water efficiency calculator must be completed.

Table 2.1 Maximum water consumption of fittings

Water fitting	Maximum consumption
WC	6/4 litres dual flush or 4.5 litres single flush
Shower	10 litres/min
Bath	185 litres
Basin taps	6 litres/min
Sink taps	8 litres/min
Dishwasher	1.25 litres/place setting
Washing machine	8.17 litres/kilogram

2.7 If the fittings approach is used, the person carrying out the work must give the local authority a notice which specifies the potential consumption should state "Less than 105 litres/person/day using fittings approach".

Optional requirement

2.8 The optional requirement applies only if imposed when planning permission is granted. Where the optional requirement applies, the estimated amount of wholesome water consumed, calculated using the water efficiency calculator, should not exceed 100 litres/person/day.

2.9 If the optional requirement applies, the person carrying out the work must inform the building control body.

2.10 As an alternative to the water efficiency calculator (paragraph 2.8), a fittings approach may be used.

2.11 If the fittings approach is used, the amount of water consumed by the fittings provided must not exceed the values in Table 2.2. If values exceed those in Table 2.2, the water efficiency calculator must be completed to show the building complies with requirement G2. Similarly, where a shower is not to be provided or where a waste disposal unit, a water softener or water re-use is to be provided the water efficiency calculator must be completed.

Table 2.2 Maximum water consumption of fittings when optional requirement applies

Water fitting	Maximum consumption
WC	4/2.6 litres dual flush
Shower	6 litres/min
Bath	165 litres
Basin taps	5 litres/min
Sink taps	6 litres/min
Dishwasher	1.25 litres/place setting
Washing machine	8.17 litres/kilogram

Notifying the building control body of the water efficiency calculation

2.12 Where regulation 36 applies, a notice that gives the estimated amount of wholesome water consumed per person per day for the dwelling as constructed should be given to the building control body. (This notice is required by regulation 37 of the Building Regulations and regulation 20(1) and (4) of the Building (Approved Inspectors etc.) Regulations.)

2.13 In most cases, this notice must be given to the building control body within five days after building work is completed. However, if all the following apply, the notice must be given on or before the day when the initial notice ceases to apply.

a. The building control body is an Approved Inspector

b. The dwelling is occupied before building work is complete.

c. The initial notice ceases to apply less than five days after the work is complete.

(The initial notice is required by regulation 18 of the Building (Approved Inspectors etc.) Regulations.)

2.14 If the building control body has agreed, the notice may be served to the email address of the building control body.

Requirement G3: Hot water supply and systems

This section deals with the requirements of Part G3 of Schedule 1 to the Building Regulations 2010.

Requirement

Requirement	*Limits on application*
Hot water supply and systems	
G3. (1) There must be a suitable installation for the provision of heated wholesome water or heated softened wholesome water to: (a) any washbasin or bidet provided in or adjacent to a room containing a sanitary convenience; (b) any washbasin, bidet, fixed bath and shower in a bathroom; and any sink provided in any area where food is prepared.	
(2) A hot water system, including any cistern or other vessel that supplies water to or receives expansion water from a hot water system, shall be designed, constructed and installed so as to resist the effects of temperature and pressure that may occur either in normal use or in the event of such malfunctions as may reasonably be anticipated, and must be adequately supported.	
(3) A hot water system that has a hot water storage vessel shall incorporate precautions to: (a) prevent the temperature of the water stored in the vessel at any time exceeding 100 °C; and (b) ensure that any discharge from safety devices is safely conveyed to where it is visible but will not cause a danger to persons in or about the building.	Requirement G3(3) does not apply to a system which heats or stores water for the purposes only of an industrial process.
(4) The hot water supply to any fixed bath must be so designed and installed as to incorporate measures to ensure that the temperature of the water that can be delivered to that bath does not exceed 48 °C.	Requirement G3(4) applies only when a dwelling is— (a) erected; (b) formed by a material change of use within the meaning of regulation 5(a) or (b).

Intention

In the Secretary of State's view, requirement G3(1) will be met if both of the following are achieved.

a. The system supplies hot water to the sanitary appliances and locations specified in the requirement without waste of water.

b. The water supplied is heated wholesome water or heated softened water.

In the Secretary of State's view, requirement G3(2) will be met if all components of the hot water system, including any cistern that supplies water to, or receives expansion water from, the hot water system, continue to safely contain the hot water at all of the following times.

a. During normal operation of the hot water system.

b. After any thermostat used to control temperature has failed.

c. When any of the safety devices fitted in accordance with requirement G3(3) are operating.

In the Secretary of State's view, requirement G3(3) will be met for a hot water storage system that has a vented storage vessel if the system complies with all of the following.

a. The storage vessel has a suitable vent pipe that connects the top of the vessel to a point open to the atmosphere above the level of the water in the cold-water storage cistern and over it.

b. The heat source or the storage vessel is fitted with a device, in addition to any thermostat, that will prevent the temperature of the stored water exceeding 100 °C.

c. The hot water system has pipework that can discharge hot water from the safety devices to an appropriate place, open to the atmosphere, where it will cause no danger to persons in or about the building.

In the Secretary of State's view, requirement G3(3) will be met for a hot water system that has an unvented storage vessel if the system complies with both of the following.

a. The storage vessel has, in addition to any thermostat, at least two independent safety devices such as those that release pressure and so prevent the temperature of the stored water exceeding 100 °C.

b. The hot water system has pipework that can discharge hot water from safety devices to be visible, open to the atmosphere and where it will cause no danger to persons in or about the building.

In the Secretary of State's view, requirement G3(4) will be met if the temperature of hot water from the outlet is appropriate for the appliance being served, and building users cannot easily alter the maximum temperature of water from the outlet.

Section 3: Hot water supply and systems

General

3.1 Hot water can be considered as heated wholesome water or heated softened wholesome water if both of the following apply.

a. The cold water supplied to the hot water system is wholesome water or softened wholesome water.

b. The installation complies with the Water Supply (Water Fittings) Regulations 1999 (SI 1999/1148 as amended).

3.2 For guidance on the Water Supply (Water Fittings) Regulations, see the *Water Regulations Guide* and online guidance published by Water Regs UK.

3.3 Gas installation work should comply with the Gas Safety (Installation and Use) Regulations 1994 (SI 1994/1886 as amended).

3.4 Electrical work associated with hot water systems should comply with **BS 7671** (IEE Wiring Regulations).

3.5 Hot water systems in dwellings and associated buildings should comply with Part P (Electrical safety – Dwellings) of Schedule 1 to the Building Regulations and Approved Document P.

3.6 For workplaces and premises controlled in connection with a trade, business or other undertaking, see HSE publication L8.

3.7 Pipework should be designed and installed to minimise the time for water to flow from the hot water storage system to hot water outlets.

3.8 For hot water systems used only to supply water for industrial processes, see the Pressure Systems Safety Regulations 2000 (SI 2000/128). Further guidance is given in *Safety of pressure systems. Pressure Systems Safety Regulations 2000. Approved Code of Practice* L122 HSE Books 2000. ISBN 0 7176 1767 X.

Design and installation of directly or indirectly heated hot water storage systems

General

3.9 Hot water storage systems should be designed and installed in accordance with **BS 6700** or **BS EN 12897**.

3.10 Hot water storage vessels should conform to **BS 853-1**, **BS 1566-1** or **BS 3198** or other relevant national standards as appropriate.

Vented hot water storage systems

3.11 Vented hot water storage systems should have a vent pipe with an internal diameter of at least 19mm. The vent pipe should connect the top of the hot water storage vessel to a point that is both:

a. open to the atmosphere above

b. over the level of the water in the cold-water storage cistern.

3.12 In addition any thermostat to control the temperature of the stored water, vented hot water storage systems should incorporate either of the following.

a. A device to prevent the stored water overheating:

   i. for direct heating heat sources, a non-self-resetting energy cut-out

   ii. for indirect heating heat sources, an overheat cut-out.

b. An appropriate safety device to discharge water if significantly overheated, for example a temperature relief valve or a combined temperature and pressure relief valve.

3.13 Vent pipes should discharge over a cold-water storage cistern conforming to either of the following standards.

a. **BS 417-2**.

b. **BS 4213**.

3.14 The cold water storage cistern into which the vent pipe discharges should be on a flat, level, rigid platform which meets all of the following.

a. Can safely support the weight of the cistern when filled with water to the rim.

b. Fully supports the bottom of the cistern over the whole of its area.

c. Extends at least 150mm in all directions beyond the edge of the cistern.

NOTE: If a metal cistern is replaced, or a plastic cistern is replaced by a larger one, the support should be upgraded in accordance with paragraph 3.14

3.15 The cistern should be accessible, to maintain, clean and/or replace it.

Unvented hot water storage systems – all systems

3.16 Unvented hot water storage systems should have at least two independent safety devices to minimise the danger from excessive pressure. An acceptable approach might be to have both of the following.

a. A non-self-resetting energy cut-out to disconnect the heat supply to the storage vessel.

b. A temperature relief valve or combined temperature and pressure relief valve to safely discharge water if over-heated.

NOTE: When choosing safety devices, both of the following should be considered.

a. The physical location of the devices.

b. The design, configuration, location of components and performance characteristics of the system to which they are attached.

NOTE: The safety devices are in addition to any thermostat to control the temperature of the stored water.

NOTE: Alternative approaches that provide an equivalent degree of safety are acceptable.

NOTE: See paragraph 3.33 for suitability of devices for primary thermal stores.

3.17 Water heaters with a capacity of 15 litres or less should have appropriate safety devices for temperature and pressure that will satisfy requirement G3(3).

Unvented hot water storage systems – systems up to 500 litres capacity and 45kW power input

3.18 Paragraphs 3.19 to 3.22 are in addition to paragraph 3.16 above.

3.19 If an indirect supply of heat to an unvented hot water storage system incorporates a boiler, the energy cut-out may be on the boiler.

3.20 Any unvented hot water storage system up to 500 litres and less than 45kW should be a proprietary unit or package. The unit and components should be appropriate to the circumstances in which they are used and should meet an appropriate standard that will ensure the requirements of requirement G3(2) and G3(3) will be met (e.g. **BS EN 12897** or **BS 6700**).

3.21 The unvented hot water storage system unit or package should be indelibly marked with the following information.

a. The manufacturer's name and contact details.

b. A model reference.

c. The rated storage capacity of the storage water heater.

d. The operating pressure of the system and of the expansion valve.

e. Relevant operating data on each of the safety devices fitted.

f. The maximum primary circuit pressure and flow temperature of indirect hot water storage system units or indirect hot water storage system packages.

3.22 The following warning, in indelible text, should be visible on the hot water storage system unit or hot water storage system package when it is installed.

WARNING TO USER
a. Do not remove or adjust any component part of this unvented water heater; contact the installer.
b. If this unvented water heater develops a fault, such as a flow of hot water from the discharge pipe, switch the heater off and contact the installer.

WARNING TO INSTALLER
a. This installation is subject to the Building Regulations.
b. Use only appropriate components for installation or maintenance.

Installed by:

Name .....

Address .....

Tel. No. .....

Completion date .....

Unvented hot water storage systems – systems over 500 litres capacity or over 45kW power input

3.23 Paragraphs 3.24 and 3.25 are in addition to paragraph 3.16.

3.24 Systems over 500 litres capacity are usually bespoke designs and, as such, are not appropriate for a third-party accredited product conformity certification scheme to approve. Where this is the case, the unvented hot water storage system should be designed to comply with paragraph 3.16 by an appropriately qualified engineer.

3.25 Any unvented hot water storage system with a power input of more than 45kW but a capacity of 500 litres or less should be a proprietary hot water storage system unit or hot water storage system package. The package and components should be appropriate to the circumstances in which they are used and should be an appropriate standard to comply with requirement G3(2) and G3(3) will be met (e.g. **BS EN 12897** or **BS 6700**).

Safety devices

Non-self-resetting energy cut-outs

3.26 Non-self-resetting energy cut-outs may be used only if they instantly disconnect the supply of energy to the storage vessel.

3.27 Non-self-resetting energy cut-outs should conform to either of the following.

a. **BS EN 60335-2-73** and **BS EN 60730-1**.

b. **BS EN 257**.

3.28 If a non-self-resetting energy cut-out operates indirectly on another device (see paragraph 3.16) to interrupt the supply of heat (e.g. it is wired to a motorised valve or some other suitable device to shut off the energy to the primary heater), either of the following should apply.

a. The energy cut-out should comply with the relevant European Standard (see paragraph 3.27).

b. The supplier or installer should be able to demonstrate that the performance of the device is equivalent to that set out in European standards.

3.29 If an electrical device is connected to the non-self-resetting energy cut-out, such as a relay or motorised valve, the device should operate to interrupt the supply of energy if the electrical power supply is disconnected.

3.30 If there is more than one non-self-resetting energy cut-out (see paragraph 3.33), each should be independent (e.g. with a separate motorised valve and a separate temperature sensor).

3.31 If an energy cut-out is fitted as set out in paragraphs 3.12a or 3.16, each heat source should have a separate non-self-resetting energy cut-out.

Temperature and pressure relief devices

3.32 Where relevant, appropriate pressure, temperature or temperature and pressure- activated safety devices should be fitted. (This is in addition to a safety device such as an energy cut-out.)

3.33 In systems that do not automatically replenish the stored water (e.g. unvented primary thermal storage vessels), temperature relief valves and combined temperature and pressure relief valves should not be used. A second non-self-resetting energy cut-out should be provided, independent of the one in paragraph 3.16(a).

3.34 Temperature relief valves and combined temperature and pressure relief valves should conform to relevant national standards, such as the following.

a. For temperature relief valves: **BS 6283-2**.

b. For combined temperature and pressure relief valves: **BS EN 1490**.

3.35 Temperature relief valves (see paragraph 3.16) should have a discharge rating at least equal to the total power input to the hot water storage system, when measured in accordance with Appendix F of **BS 6283-2** or **BS EN 1490**.

3.36 Temperature relief valve(s) or combined temperature and pressure relief valve(s) (see paragraph 3.16) should be on the storage vessel, so that the stored water does not exceed 100 °C.

3.37 In hot water storage system units and hot water storage system packages, the temperature relief valve(s) (see paragraph 3.16) should comply with the following.

a. Be factory fitted.

b. Not be disconnected, other than when being replaced.

c. Not be moved to another installed device or fitting

3.38 The safety and performance of an unvented system depends on choosing system and safety devices appropriate for the location, and on correctly installing the system. Building owners and occupiers should choose installers who have the necessary skills.

An installer's skills can be demonstrated by, for example, being registered with a competent person scheme for this type of work, or by holding a current registered operative skills certification card for unvented hot water systems.

3.39 If the installer is *not* registered with a competent person scheme for installing unvented hot water systems, before an unvented system is installed, the building control body must be notified.

NOTE: The building control body may then check that work is safe and meets current energy efficiency requirements.

3.40 If the installer is registered with a competent person scheme for installing unvented hot water systems, work does not need to be notified in advance to the building control body.

NOTE: Installers registered with such schemes self-certify that work complies with all relevant requirements in the Building Regulations. The building owner/occupier will receive a building regulations certificate of compliance; this is usually issued by the operator of the competent person scheme.

Electric water heating

3.41 Electric fixed immersion heaters should comply with **BS EN 60335-2-73**.

3.42 Electric instantaneous water heaters should comply with **BS EN 60335-2-35**.

3.43 Electric storage water heaters should comply with **BS EN IEC 60335-1** and **BS EN 60335-2-21.**

Solar water heating

3.44 Factory-made solar water heating systems should comply with **BS EN 12976-1**.

3.45 Other solar water heating systems should comply with either of the following.

a. **BS EN 12977-1**.

b. **BS 5918**.

NOTE: Further guidance is given in CIBSE's Guide G and *Solar Heating Design and Installation Guide*.

3.46 If solar water heating systems are used, an additional heat source should be available.

NOTE: The additional heat source should be used, when necessary, to maintain the water temperature to restrict microbial growth.

NOTE: All components of solar hot water systems should be rated to appropriate temperatures and pressures. Some solar hot water systems operate at elevated temperatures and pressures.

Discharge pipes from safety devices

Discharge pipe Diagram 1 (D1)

3.47 Safety devices such as a temperature relief valve or combined temperature and pressure relief valve (see paragraphs 3.12 or 3.16) should discharge to a tundish. The discharge should be either direct, or to a manifold via a short metal pipe (D1).

3.48 The diameter of discharge pipe (D1) should be at least the nominal outlet size of the safety device, e.g. temperature relief valve.

3.49 If a manifold is used, it should be large enough to accept and discharge the total discharge from the discharge pipes connected to it.

3.50 If valves other than a combined temperature and pressure relief valve from one unvented hot water system discharge to the manifold used by the safety devices, the manifold should be factory fitted as part of the hot water storage system unit or hot water storage system package.

Tundish

3.51 The tundish should comply with the following.

a. Be vertical.

b. Be in the same space as the unvented hot water storage system.

c. Be fitted as close as possible to, and lower than, the safety device, with no more than 600mm of pipe between the valve outlet and the tundish (see Diagram 1).

d. Incorporate a suitable air gap.

3.52 Any discharge should be visible at the tundish. If people may be unaware of discharges from safety devices, e.g. in dwellings occupied by people with impaired vision or mobility, the installation of a suitable safety device to warn when discharge takes place, e.g. an electronically operated device, should be considered.

Discharge pipe Diagram 1 (D2)

3.53 The discharge pipe (D2) from the tundish should have both of the following.

a. A vertical section of pipe at least 300mm long, below the tundish, and before any elbows or bends in the pipework (see Diagram 1).

b. After the vertical section, a continuous fall of at least 1 in 200.

3.54 The discharge pipe (D2) should be made of either of the following.

a. Metal.

b. Other material shown to be able to safely withstand the temperatures of the water discharged. The pipe should be clearly and permanently marked to show the product and performance standard (e.g. as specified in the relevant part of **BS 7291-1**.

3.55 Unless the total equivalent hydraulic resistance of discharge pipe D2 exceeds that of a straight pipe 9m long, the diameter of D2 should be appropriate to the diameter of the nominal outlet size of the safety device, as shown in Table 3.1 and the worked example. Bends must be considered when calculating the flow resistance.

NOTE: An alternative approach for sizing discharge pipes would be to follow Annex D, section D.2 of **BS 6700**.

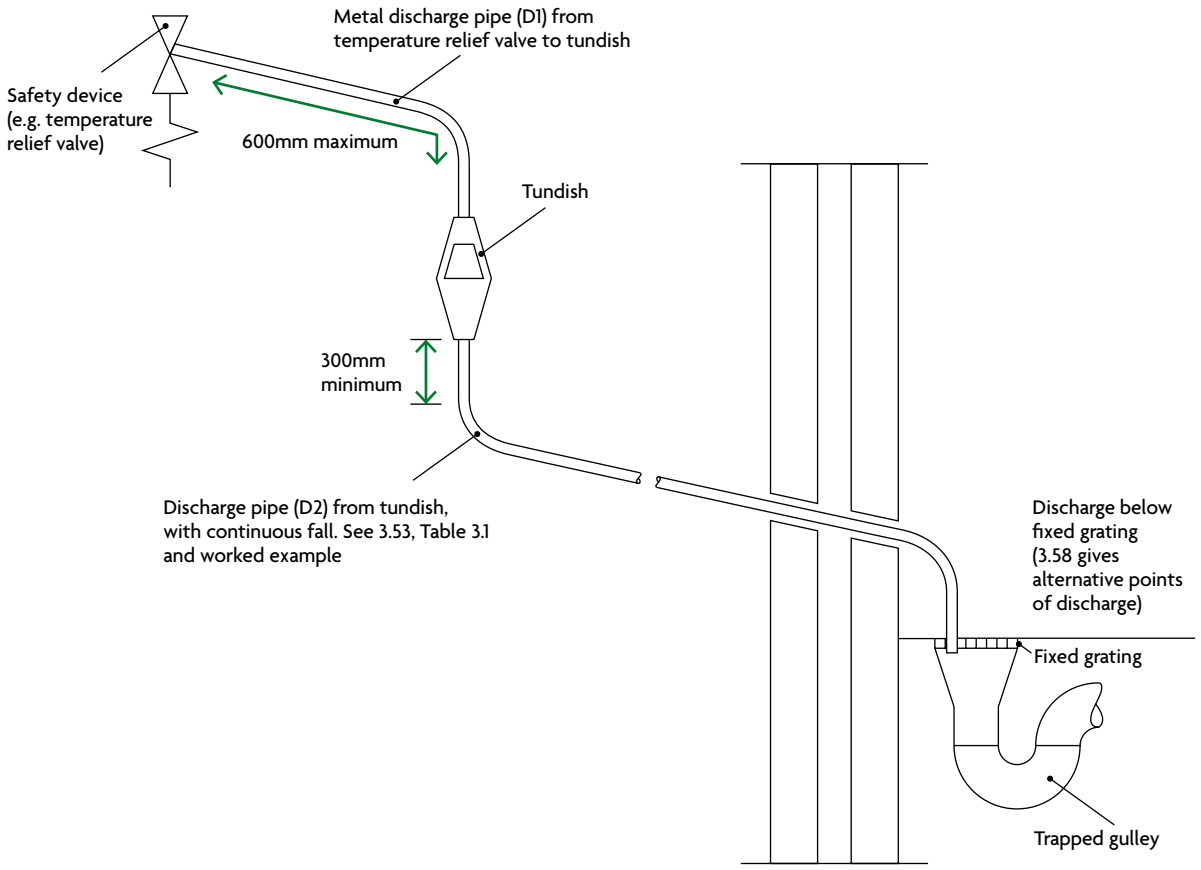


Diagram 1 Typical discharge pipe arrangement

Table 3.1 Sizing of copper discharge pipe 'D2' for common temperature relief valve outlet sizes

Valve outlet size	Minimum size of discharge pipe D1*	Minimum size of discharge pipe D2* from tundish	Maximum resistance allowed, expressed as a length of straight pipe (i.e. no elbows or bends)	Resistance created by each elbow or bend
G½	15mm	22mm	Up to 9m	0.8m
		28mm	Up to 18m	1.0m
		35mm	Up to 27m	1.4m
G¾	22mm	28mm	Up to 9m	1.0m
		35mm	Up to 18m	1.4m
		42mm	Up to 27m	1.7m
G1	28mm	35mm	Up to 9m	1.4m
		42mm	Up to 18m	1.7m
		54mm	Up to 27m	2.3m

*see 3.48 and 3.55 and Diagram 1

NOTES: The table is based on copper tube. Plastic pipes may be of different bore and resistance.
Sizes and maximum lengths of plastic should be calculated using data prepared for the type of pipe being used.

Worked example

The example below is for a G½ temperature relief valve with a discharge pipe (D2) that has four 22mm elbows and a length of 7m from the tundish to the point of discharge.

From Table 3.1:

Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from a G½ temperature relief valve is: 9m

Subtract the resistance for four 22mm elbows at 0.8m each = 3.2m

Therefore, the maximum permitted length is 5.8m, which is less than the actual length of 7m, therefore, calculate the next largest size.

Maximum resistance allowed for a straight length of 28mm copper discharge pipe (D2) from a G½ temperature relief valve is: 18m

Subtract the resistance for four 28mm elbows at 1.0m each = 4m

Therefore the maximum permitted length is: 14m

As the actual length is 7m, a 28mm (D2) copper pipe is satisfactory.

3.56 If one discharge pipe serves more than one system, it should be at least one pipe size larger than the largest discharge pipe (D2) to be connected.

3.57 Only if it can be shown that the soil discharge stack can safely withstand the temperatures of the water discharged should the discharge pipe be connected to the soil discharge stack.

The discharge pipe should comply with all of the following.

a. Contain a mechanical seal, not incorporating a water trap, which allows water into the branch pipe but does not allow foul air from the drain to be ventilated through the tundish.

b. Be a separate branch pipe with no sanitary appliances connected to it.

c. Be a plastic pipe used as branch pipe to carry discharge from a safety device made of either polybutylene (PB), cross-linked polyethylene (PE-X) or unplasticised poly(vinyl chloride) (PVC-U) which complies with a national standard such as Class S of **BS 7291-2**, Class S of **BS 7291-3** or **BS EN 1329-1**, respectively.

d. Be continuously marked with a warning that no sanitary appliances should be connected to the pipe.

NOTE: Plastic pipes should be joined and assembled with fittings appropriate to the circumstances in which they are used, as set out in **BS EN ISO 1043-1**.

NOTE: Where pipes cannot be connected to the stack, it may be possible to route a dedicated pipe beside or near the discharge stack

Termination of discharge pipe

3.58 The discharge pipe (D2) from the tundish should end in a safe place where there is no risk to persons nearby.

3.59 The following are examples of acceptable discharge arrangements.

a. Discharges to a trapped gully with the end of the pipe below a fixed grating and above the water seal.

b. Downward discharges from no more than 100mm above external surfaces such as car parks, hard standings and grassed areas, if a wire cage or similar guard prevents contact whilst maintaining visibility.

c. Discharges at high level, e.g. into a metal hopper and metal downpipe. The end of the discharge pipe should be clearly visible or onto a roof that can withstand high temperature discharges of water and 3m from any plastic guttering system that collects such discharges.

3.60 The discharge will be high temperature water and steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges.

Preventing excessive temperatures

3.61 If the operating temperature of domestic hot water in the storage vessel in a dwelling may exceed 80°C under normal operating conditions, the outlet from the storage vessel should be fitted with a device to ensure that the temperature of water to the domestic hot water distribution system does not exceed 60°C.

NOTE: The water temperature may exceed 80°C in vessels used as heat stores and those connected to solar heat collectors or solid fuel boilers that do not have controls between the boiler and the hot water vessel.

NOTE: Suitable devices include an in-line hot water supply tempering valve in accordance with **BS EN 15092**.

Preventing scalding

3.62 The temperature of hot water supplied to a bath should be limited to a maximum 48°C using a fail to safe[1] (i.e. not discharge water above the maximum temperature) in-line blending valve or other appropriate temperature control device. The valve or device should have both of the following.

a. A maximum-temperature stop.

b. Suitable pipework.

3.63 In-line blending valves and composite thermostatic mixing valves should be compatible with their sources of hot and cold water. In-line blending valves should not be easily altered by building users.

3.64 The length of supply pipes between in-line blending valves and outlets should be minimised to prevent waterborne pathogens. If intermittent use of the bath is anticipated, provision should be made for high temperature flushing to pasteurise pipes and outlet fittings.

NOTE: Further guidance on in-line blending valves is given in BRE Information paper IP14/03.

NOTE: In some buildings, e.g. care homes, in-line blending valves should meet the additional performance standards in Department of Health Performance Specification D 08.

1 European Standard such as **BS EN 111** or **BS EN 1287**.

Installation

3.65 Workmanship should be a high standard in accordance with appropriate standards such as **BS 8000-15**.

Commissioning fixed building services

3.66 Water heaters should be properly installed and commissioned to be energy-efficient.

3.67 Fixed building services, including controls, should be commissioned by testing and adjusting as necessary to ensure they use no more fuel and power than is reasonable in the circumstances.

3.68 Commissioning means taking completed systems to working order to compliance with Part L. For each system, commissioning includes the following.

a. Setting-to-work.

b. Regulation (that is testing and adjusting repetitively) to achieve the specified performance.

c. The calibration, setting up and testing of associated automatic control systems.

d. Recording of systems and the performance test results that have been accepted as satisfactory.

3.69 Not all fixed building services need to be commissioned. For example, some systems have only 'on' and 'off' settings. In other cases, commissioning is possible but, in the specific circumstances, would have no effect on energy use.

3.70 Commissioning must follow a procedure approved by the Secretary of State. For new and existing dwellings, the approved procedure for hot water systems is given in Approved Document L, Volume 1; for buildings other than dwellings in CIBSE's Commissioning Code M.

3.71 Commissioning must be carried out in such a way as not to prejudice compliance with any applicable health and safety requirements.

3.72 Commissioning is often carried out by the person who installs the system. Sometimes it may be carried out by a subcontractor or by a specialist firm. It is important that whoever carries it out follows the relevant approved procedure in doing so.

Notice of completion of commissioning

3.73 If testing and adjustment is possible and will affect the energy efficiency of the fixed building service, commissioning should be done. The Building Regulations (regulation 20C(2)) and the Building (Approved Inspectors etc.) Regulations (regulation 20(1) and (6)) require the person who carries out the work to give a notice to the relevant building control body that commissioning has been carried out according to a procedure approved by the Secretary of State.

3.74 The notice of commissioning should be given within the following time after commissioning is complete.

a. If work is carried out in accordance with a building notice, full plans, or an initial notice or amendment notice, the notice should be given within five days.

b. In other cases, for example where work is carried out by a person registered with a competent person scheme, the notice must be given not more than 30 days after the completion of work.

3.75 If the fixed building services which require commissioning are installed by a person registered with a competent person scheme, the notice of commissioning will be given by that person.

3.76 Until the building control body receives notice of commissioning it is unlikely to be satisfied that Part G has been complied with, and therefore unlikely to be able to give a completion/final certificate.

Requirement G4: Sanitary conveniences and washing facilities

This section deals with the requirements of Part G4 of Schedule 1 to the Building Regulations 2010.

Requirement

Requirement	*Limits on application*
Sanitary conveniences and washing facilities	
G4 (1) Adequate and suitable sanitary conveniences must be provided in rooms provided to accommodate them or in bathrooms.	
(2) Adequate hand washing facilities must be provided in:	
(a) rooms containing sanitary conveniences; or	
(b) rooms or spaces adjacent to rooms containing sanitary conveniences.	
(3) Any room containing a sanitary convenience, a bidet, or any facility for washing hands provided in accordance with paragraph (2)(b), must be separated from any kitchen or any area where food is prepared.	

Intention

In the Secretary of State's view, requirement G4 will be met if the following are provided.

a. Enough sanitary conveniences of an appropriate type for the sex and age of the persons using the building are provided, considering the nature of the building.

b. Hand washing facilities in or next to rooms that contain sanitary conveniences. In-line blending valves should not be easily altered by building users. The hand washing facilities are sited, designed and installed so as not to be prejudicial to health.

Section 4: Sanitary conveniences and washing facilities

General

4.1 The following should also be referred to.

a. The requirements for accessible sanitary conveniences and hand washing facilities of Part M (Access to and use of buildings) of Schedule 1 to the Building Regulations.

b. Approved Document M.

c. The Regulators' performance specification for water closet (WC) suites, made under the Water Supply (Water Fittings) Regulations 1999 (SI 1999/1148 as amended).

4.2 The requirement for ventilation is in Part F (Ventilation) of Schedule 1 to the Building Regulations. Guidance on ventilation of sanitary accommodation is given in Approved Document F.

4.3 Regulations on the number, type and siting of sanitary conveniences for staff in workplaces, including on separate provision for men and women, are also given in the Workplace (Health, Safety and Welfare) Regulations 1992.

4.4 Further guidance on washbasins associated with sanitary conveniences is given in the Food Standards Agency's online Guidance for Food Businesses.

4.5 Guidance on selecting, installing and maintaining sanitary appliances, including composting toilets, is given in **BS 6465-3**.

4.6 If a sanitary appliance has hot and cold taps, the hot tap should be on the left.

Scale of provision and layout in dwellings

4.7 Any dwelling (house or flat) should have both of the following.

a. At least one sanitary convenience, which includes a WC provided in accordance with requirement M4(1) (Sanitary conveniences in dwellings) of Schedule 1 to the Building Regulations and with Approved Document M, Volume 1.

b. An associated hand washing facility.

NOTE: Requirement M4(1) requires a sanitary convenience in the principal/entrance storey of a dwelling.

4.8 Each sanitary convenience should have an associated hand washing facility.

4.9 Hand washing facilities should be in either of the following.

a. The same room as the sanitary convenience.

b. A room or place next to, and that provides the only access to, the room with the sanitary convenience. The room/place should not be used for food preparation.

4.10 There should be a door between a place with a sanitary convenience and/or associated hand washing facilities and any place used for food preparation (including a kitchen). See Diagrams 2 and 3.

NOTE: The following apply for dwellings.

a. A room with both a sanitary convenience and a basin for hand washing does not need a lobby to separate it from a food preparation area (Diagram 2).

b. For a room that contains only a sanitary convenience, people should access the room or space with the associated hand washing facilities before they enter an area used for food preparation. There should be a door between the hand washing facilities and food preparation area (Diagram 3).

4.11 Guidance on providing activity space around sanitary appliances is given in **BS 6465-2**.

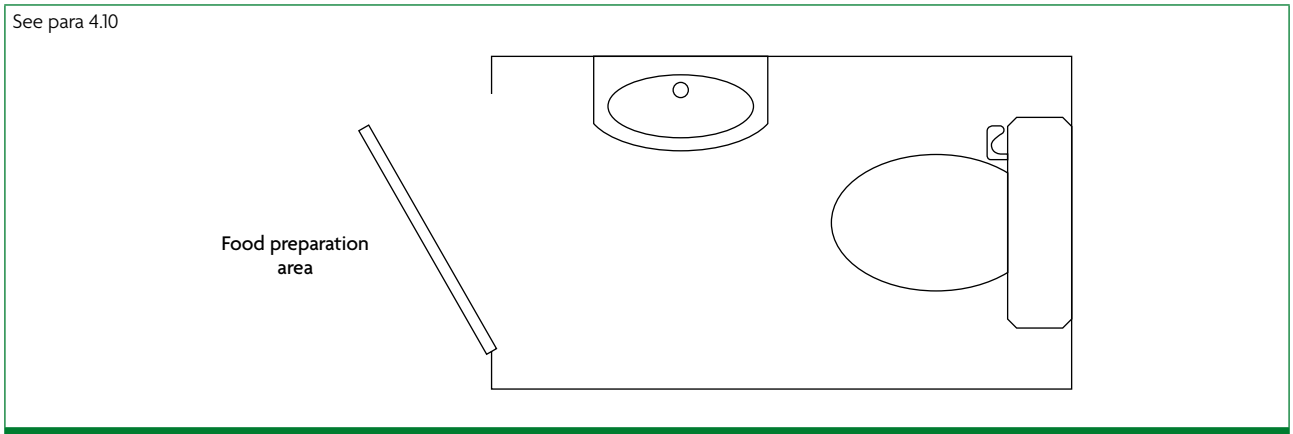


Diagram 2 Separation between hand washbasin/WC and food preparation area – single room

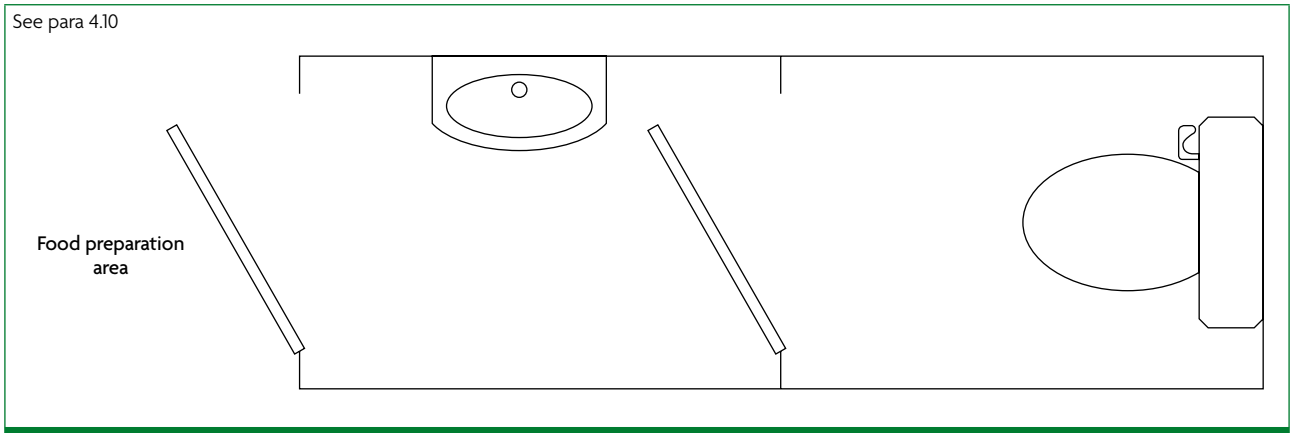


Diagram 3 Separation between hand washbasin/WC and food preparation area – two rooms

Scale of provision and layout in buildings other than dwellings

4.12 The Workplace (Health, Safety and Welfare) Regulations 1992 require that a minimum number of sanitary conveniences must be provided in workplaces. Guidance on the calculation of sanitary provision is available in HSE publications L24 and INDG293.

4.13 Part M of Schedule 1 of the Building Regulations 2010 sets out requirements relating to access to and use of buildings. Approved Document M provides guidance on sanitary accommodation. Such accommodation may form part of the total number of sanitary conveniences in a building.

4.14 Further guidance on sanitary conveniences is given in **BS 6465-1**. This guidance may be used for buildings other than workplaces or for workplaces where the aim is to provide more than the minimum number of sanitary conveniences given in the Approved Code of Practice.

4.15 A sanitary convenience may be provided in any of the following.

a. A self-contained room that also has hand washing facilities.

b. A room with more than one cubicle, with shared hand washing facilities.

c. A self-contained room, with hand washing facilities in an adjacent room.

4.16 Urinals, WC cubicles and hand washing facilities may be in the same room.

4.17 There should be a door between a place with a sanitary convenience and/or associated hand washing facilities and a place used for food preparation.

4.18 Guidance on providing activity space around sanitary appliances is given in **BS 6465-2**.

Chemical and composting toilets

4.19 Chemical toilets or composting toilets may be used if all of the following apply.

a. Suitable arrangements can be made to dispose of the waste, either on or off site.

b. Waste can be removed without carrying it through any living space or an area used for food preparation (including a kitchen).

c. No part of the installation is made ineffective by flood water.

4.20 There are no British or European standards for composting toilets. For appropriate guidance, see **ANSI/NSF 41**.

4.21 Composting toilets should not be connected to an energy source other than for ventilation or to sustain composting.

Discharges to drains

NOTE: See Approved Document H for guidance on traps, branch discharge pipes, discharge stacks and foul drains.

4.22 A WC fitted with flushing apparatus should discharge to an adequate system of drainage.

4.23 A urinal fitted with flushing apparatus should discharge, through a grating, trap or mechanical seal, to a branch pipe and a discharge stack or drain.

4.24 A WC fitted with a macerator and pump may be connected to a small bore drainage system that discharges to a discharge stack if both of the following apply.

a. There is also access to a WC that discharges directly to a gravity system.

b. The macerator and pump complies with **BS EN 12050-1** or **BS EN 12050-3**.

NOTE: If greywater recycling is used, lower overall wastewater flows are likely; this should be considered when the drain is designed. This is particularly relevant at the furthest or highest spot in a drainage area if only one building is connected.

Approved Document T

4.25 In addition to the requirements of Part G4 of Schedule 1 to the Building Regulations, Part T1 places the following requirements.

NOTE: The recommendations of Approved Document T apply to buildings other than dwellings. Requirement T1 does not apply to schools and cellular accommodation in custodial facilities.

NOTE: Requirement T1 does not apply to toilets provided in individual rooms for residential purposes, such as hotels and care homes.

a. Requirement T1 sets a minimum level of provision for specific facilities which should be provided in addition to (or contribute to meeting) requirements for general sanitary provision (WCs and urinals) required under regulation 20 of the Workplace (Health, Safety and Welfare) Regulations 1992. In establishing provision reference should be made to guidance on calculation of sanitary provision in HSE publications L24 and INDG293.

b. Approved Document T describes the size and layout of ambulant toilet accommodation in Sections 3 and 5. However, guidance on the design of disabled persons' toilets for either wheelchair users or ambulant disabled persons is provided in Approved Document M, Volume 2.

c. Other sanitary provision for baby changing and Changing Places toilets should be provided as described in Section 5 of Approved Document M, Volume 2.

d. Part T does not cover the numbers of toilet or the access to and use of toilets. Approved Document G provides guidance in paragraphs 4.12 to 4.14 on the number of toilets required for a building type. Approved Document G also covers the provision of handwashing facilities and for separation of toilets from kitchens and areas used for food preparation.

Requirement G5: Bathrooms

This section deals with the requirements of Part G5 of Schedule 1 to the Building Regulations 2010.

Requirement	
Requirement	*Limits on application*
Bathrooms **G5** A bathroom must be provided containing a wash basin and either a fixed bath or a shower.	Requirement G5 applies only to dwellings and to buildings containing one or more rooms for residential purposes.

Intention

In the Secretary of State's view, requirement G5 will be met if a bathroom is provided that contains a fixed bath or shower, and a washbasin.

Section 5: Bathrooms

General

5.1 For appropriate backflow protection on taps, including mixer fittings and hose connections, see the Water Supply (Water Fittings) Regulations 1999 (SI 1999/1148).

5.2 For requirements for ventilation, see Part F of Schedule 1 to the Building Regulations (Ventilation). For guidance on ventilation of sanitary accommodation, see Approved Document F.

5.3 For requirements for electrical safety, see Part P of Schedule 1 to the Building Regulations (Electrical safety). For guidance, see Approved Document P.

5.4 For guidance on selecting, installing and maintaining sanitary appliances, see **BS 6465-3**.

5.5 If a sanitary appliance has both hot and cold taps, the hot tap should be on the left.

Scale of provision and layout in dwellings

5.6 Any dwelling (house or flat) must have at least one bathroom with a fixed bath or shower, and a washbasin.

5.7 For guidance on providing activity space around sanitary appliances, see **BS 6465-2**.

Scale of provision and layout in buildings with rooms for residential purposes

5.8 The number of fixed baths or showers and washbasins that should be provided in buildings with rooms for residential purposes is given in **BS 6465-1**.

Discharges to drains

NOTE: For guidance on traps, branch discharge pipes, discharge stacks and foul drains, see Approved Document H.

5.9 A sanitary appliance used for personal washing should discharge through a grating, trap and branch discharge pipe to an adequate system of drainage.

5.10 A anitary appliance used for personal washing that has a macerator and pump may be connected to a small bore drainage system that discharges to a discharge stack if both of the following apply.

a. There is also access within the building to washing facilities that discharge directly to a gravity system.

b. The macerator and pump complies with **BS EN 12050-2**.

Requirement G6: Food preparation areas

This section deals with the requirements of Part G6 of Schedule 1 to the Building Regulations 2010.

Requirement

Requirement	*Limits on application*
Food preparation areas	
G6 A suitable sink must be provided in any area where food is prepared.	

Intention

In the Secretary of State's view, Requirement G6 will be met if in any place where food is prepared (including a kitchen) a sink is provided.

NOTE: If a dishwasher is provided in a separate room, an additional sink need not be provided in that room.

Section 6: Food preparation areas

Scale of provision in dwellings

6.1 In any kitchen or food preparation area, a sink should be provided.

6.2 If a dishwasher is provided in a room that is not used for food preparation, another sink need not be provided in that room.

Scale of provision in buildings other than dwellings

6.3 All buildings other than dwellings, should comply with paragraph 6.1.

6.4 In buildings where the Food Safety and Hygiene (England) Regulations 2013 and the Food Hygiene Rating (Wales) Regulations 2013 apply, separate hand washing facilities may be needed. This is in addition to hand washing facilities associated with WCs to comply with Requirement G4.

Discharges to drains

NOTE: For guidance on traps, branch discharge pipes, discharge stacks and foul drains, see Approved Document H.

6.5 A sink should discharge through a grating, trap and branch discharge pipe to an adequate system of drainage.

Appendix A: Key terms

NOTE: Terms marked * are defined in legislation, either in the Building Act 1984 or the Building Regulations 2010. The definitions in the legislation may be fuller than those given here.

***Building** Any permanent or temporary building, or part of that building – such as a dwelling (house or flat) or public building – but not any other kind of structure.

Building control body A local authority or a registered building control approver.

***Building work** Comprises any of the following:

a. erecting or extending a building

b. supplying or extending a controlled service or fitting in or in connection with a building

c. the material alteration of a building or a controlled service or fitting.

Combined temperature and pressure relief valve A mechanically operated valve that opens to discharge water when water exceeds a fixed (factory set) temperature or a fixed (factory set) pressure.

Controlled service or fitting A service or fitting subject to Schedule 1 to the Building Regulations in respect of:

a. sanitation

b. hot water safety

c. water efficiency,

d. drainage and waste disposal

e. combustion appliances and fuel storage

f. conservation of fuel or power, gas and electrical safety.

Direct heating A method of heating in which the heat source is part of the hot water vessel. Examples are:

a. an electrical immersion heater

b. a burner

c. a gas burner with a flue that transfers heat into the hot water vessel, or to water circulating to the vessel.

Domestic hot water Water heated for cooking, food preparation, personal washing or cleaning purposes, in any building.

***Earth-closet** A toilet in which faecal matter is collected in a movable receptacle for the reception of faecal matter and deodorised by using earth, ashes, chemicals, or other methods. Examples include chemical and composting toilets.

Food preparation To handle, make and cook food.

Greywater Domestic wastewater other than faecal matter and urine. Appropriately treated greywater may replace wholesome water in WCs, urinals or washing machines, or for irrigation

Harvested rainwater Rainwater from roofs or other suitable surfaces that is collected and stored. Appropriately treated rainwater may replace wholesome water in WCs, urinals or washing machines, or for irrigation.

Heated wholesome water Water that, when cold, was wholesome water, and has been heated.

Hot water storage system A vessel for storing:

a. heated wholesome water or heated softened wholesome water for later use

b. water that is used to heat other water

together with any safety devices described in paragraphs 3.9 and 3.11 of this approved document, and all other applicable operating devices.

Hot water storage system package A hot water storage system that has the safety devices described in paragraphs 3.9 and 3.16 of this approved document factory-fitted by the manufacturer, and operating devices fitted by the installer.

Hot water storage system unit A hot water storage system that has the safety devices described in paragraphs 3.9 and 3.16 of this approved document and all other applicable operating devices factory-fitted by the manufacturer.

Indirect heating A method of heating stored water through a heat exchanger.

Kitchen A room or part of a room which contains a sink and food preparation facilities

Material alteration An alteration which makes a building or controlled service or fitting not comply with, or become more unsatisfactory in relation to, Schedule 1 requirements for: structure, means of warning and escape, internal and external fire spread, fire service access and facilities, and access and use.

Non-self-resetting energy cut-out A device that will interrupt the supply of heat to a hot water storage vessel when the water exceeds a fixed (factory set) temperature. When triggered, the device may only be reset manually.

Primary thermal store A store of heat energy that can be used to heat domestic hot water through a heat exchanger. The thermal store can be heated by a variety of heat sources. Primary hot water thermal stores can be vented or unvented.

Risk assessment The purposes of this document, risk assessment means:

a. identifying the hazards associated with a process or activity

b. for each hazard, assessing its probability and consequences.

***Room for residential purposes** A room or suite of rooms which is not a house or flat, and in which one or more persons live and sleep. A room for residential purposes includes a room in a hostel, hotel, boarding house, hall of residence or residential home, but does not include a room in a hospital or other establishment to accommodate patients.

Sanitary accommodation A room containing a WC or urinal, whether or not it also contains other sanitary appliances. Sanitary accommodation that contains one or more cubicle and where air circulation freely throughout the space, counts as a single space.

Sanitary appliance A WC, urinal, bath, shower, washbasin, sink, bidet or drinking fountain. Sanitary appliances include those not connected to a water supply (e.g. composting toilet) or drain (e.g. waterless urinal).

***Sanitary convenience** A WC, earth closet or urinal.

Sink A receptacle that is used to hold water (for food preparation or to wash up) supplied through a tap, and/or a vented wastepipe.

***Softened wholesome water** Water that is wholesome as under section 67 of the Water Industry Act 1991 (standards of wholesomeness) as the regulations apply to Part G of Schedule 1 in accordance with paragraph (2c). The water may contain more sodium than specified in those regulations if caused by a water softener or water softening process which reduces the concentrations of calcium and magnesium.

Temperature relief valve A mechanically operated valve that opens to discharge water when water exceeds a fixed (factory set) temperature.

Tundish A device, installed in the discharge pipe from a valve, that provides an air-break to allow safe discharge to a place of termination. The tundish shows a visible indication of a water discharge and prevents its unintended reverse flow.

Unvented (closed) hot water storage system A vessel fed with cold water from a supply pipe or dedicated storage vessel (without a vent pipe), in which water is heated by direct heating or indirect heating. Expansion of the heated water is accommodated either internally or externally. The system has safety devices to prevent water temperatures exceeding 100 °C to control primary flow, prevent backflow, control working pressure and accommodate expansion.

Urinal An appliance used to receive and dispose of urine.

Vented (open) hot water storage system A vessel fed with cold water from a dedicated storage cistern (with a vent pipe). Expansion of the heated water is accommodated through the cold feed pipe. As a safety device, the vent pipe connects the top of the vessel to a point open to the atmosphere above the cold-water storage cistern.

***Water-closet (WC)** A closet with both:

a. a separate fixed receptacle that connects to a drainage system

b. a supply of clean water to flush the WC.

Wholesome water Water that complies with section 67 (Standards of wholesomeness) of the Water Industry Act 1991. At the time of publication of this approved document, the relevant regulations are:

a. for England, the Private Water Supplies Regulations 2016 (SI 2016/618)

b. for Wales, the Private Water Supplies (Wales) Regulations 2017 (SI 2017/1041)

c. for England, the Water Supply (Water Quality) Regulations 2000 (SI 2000/3184 as amended)

d. for Wales, the Water Supply (Water Quality) Regulations 2001 (SI 2001/3911 as amended).

Appendix B: Water efficiency calculator for new dwellings

The water efficiency calculation methodology

B1 This appendix gives the methodology for estimating the amount of potable water consumed in each new dwelling. The calculation methodology should be used to assess whether a new building complies with the water performance targets in regulation 36 as set out below. The water efficiency calculator is not a design tool for water supply and drainage systems. The water efficiency calculator also does not calculate the actual amount of potable water consumed by a new dwelling. Behaviour and changing behaviour may affect the amount of potable water used throughout a home.

Performance target	Maximum calculated consumption of potable water (litres/person/day)
Regulation 36 para (2)a	105
Regulation 36 optional requirement para (2)b	100

B2 Before the calculation methodology is used, figures should be taken from manufacturers' product information for the amount of water consumed by each terminal fitting, including the following.

a. WCs

   i. WC suite: Flushing capacity. For dual flush WCs, include the volume of full and part flush.

   ii. Multiple WCs with different flushing capacities: average effective flushing volume, must be used as set out in paragraphs B8 and B11.

b. Bidets

   i. Bidets are not included in the water efficiency calculator for new dwellings, because they consume little water. Anecdotal evidence shows that bidets often reduce the amount of water consumed by other fittings, rather than increase the total amount consumed in a dwelling.

c. Taps

   i. Each tap: flow rate at full flow rate in litres per minute, measured:

      – for high pressure (Type 1) taps: at a dynamic pressure of 3±0.2 bar (0.3±0.02 MPa)

      – for low pressure (Type 2) taps: at a dynamic pressure of 0.1±0.02 bar (0.01±0.002 MPa)

      (**BS EN 200**.)

Include any reduced flow rate for flow restrictions.

ii. Multiple taps (e.g. separate hot and cold taps): The flow rate of each tap, is needed to calculate an average flow rate in accordance with paragraphs B8 to B10.

iii. 'Click taps' and other taps with a 'water break': the manufacturer's stated full flow rate (measured as described above), not the flow rate at the break point. A factor for percentage of flow rate is assumed within the use factor for taps.

iv. Do not include taps on baths in the calculation, as their water consumption is included in the use factor for baths.

d. Baths

i. Total capacity of one bath to overflow, in litres (excluding displacement, which is included in the use factor for baths).

ii. Multiple baths with various capacities: average capacity, as set out in paragraphs B8 to B10.

iii. Do not include spa hot tubs in the calculation, as they are generally not filled every day, and the water consumed each year is minimal.

e. Dishwashers

i. Litres per place setting. Use the value on the EU Energy Label, i.e. annual water use ÷ (280 × number of place settings).

ii. No dishwasher: Assume 1.25 litres per place setting.

iii. Multiple dishwashers with various consumptions: average volume of water consumed, as set out in paragraphs A8 to A10.

f. Washing machines

i. Litres per kilogram of dry load. Use the value on the EU Energy Label, i.e. annual water use ÷ (220 × capacity in kg).

ii. No washing machine (therefore consumption figures are unknown): assume 8.17 litres per kilogram.

iii. Multiple washing machines with various consumptions: average volume of water consumed, as set out in paragraphs B8 to B10.

g. Showers

i. Each shower: Flow rate at the outlet, using cold water (T ≤ 30 °C), in litres per minute, measured:

– for high pressure (Type 1) supply systems: at a dynamic pressure of 3±0.2 bar (0.3±0.02 MPa)

– for low pressure (Type 2) supply systems: at a dynamic pressure of 0.1±0.05 bar (0.01±0.005 MPa)

(**BS EN 1112**).

ii. Multiple showers with various flow rates: average flow rate, as set out in paragraphs B8 to B10.

h. Water softeners (where present)
   i. Percentage of total capacity used per regeneration cycle.
   ii. Water consumed per regeneration cycle, in litres.
   iii. Average number of regeneration cycles per day.
   iv. Number of occupants:
      – assume two occupants in the first bedroom and one occupant per additional bedroom
      – studio flats: assume two occupants.
   v. Do not include water softeners that do not consume water, such as electromagnetic types, in the calculation.

i. Waste disposal units (where present)
   i. Assume 3.08 litres of water consumed per person per day.

j. External taps
   i. Flow rates of external taps are not included in the calculation, as an external water use of 5 litres per person per day is assumed.

B3 If options for improving the efficiency of terminal fittings (taps, WCs etc.) have been maximised and further savings are needed to reduce the volume of water consumed and achieve higher water efficiency, rainwater harvesting and greywater recycling may be used:

a. Greywater (in accordance with **BS 8525**)
   i. Manufacturer's or system designer's percentage for used water to be recycled, considering the storage capacity of the system.
   ii. Volume of recycled water collected from use of bath, shower and wash hand basin, dishwasher and washing machine. Calculate the volume collected as shown in Table B1 or Tables B4.3, B4.4 and B4.5.
   iii. The volume of water consumed by fittings where greywater is used:
      – if greywater is used in fittings which include WCs and washing machines: calculate the volume as shown in Table B1
      – if greywater is used in only some fittings: calculate the volume as shown in Tables B4.1 and B4.2

b. Rainwater (in accordance with **BS 8515**)
   i. Collection area
   ii. Yield co-efficient and hydraulic filter efficiency
   iii. Rainfall: average, in mm/year
   iv. Daily non-potable water demand.

B4 Large water consuming installations such as swimming pools and spa hot tubs, where water is replaced over a greater period, do not need to be included in the calculations.

Calculation tables

B5 The calculation tables should be used as follows.

1. Figures from manufacturers' product details should be entered into Table B1 to calculate the volume of water consumed by each fitting in litres per person per day.
2. If multiple fittings of the same type have various flow rates or capacities (e.g. hot and cold taps with different flow rates), Tables B2.1 to B2.7 should be used to determine the average flow rate or capacity of such fittings.
3. The volume of water consumed by water softeners in litres per person per day should be calculated using Table B3.
4. Total water consumption figures should be rounded to one decimal place. Values other than for total water consumption should be rounded to two decimal places.

B6 The total calculated use resulting from Table B1 is the total volume of water consumed by all water consuming fittings per person.

To calculate the volume of water consumed per person per day, any greywater or rainwater should be deducted from the total calculated use, using figures from Tables B4.6 and B5.5.

B7 To calculate the total volume of water consumed, external water use of 5 litres/person/day should be added to the total volume of water consumed.

Table B1 Water efficiency calculator

Installation type	Unit of measure	(1) Capacity/ flow rate	(2) Use factor	(3) Fixed use (litres/ person/day)	(4) Litres/ person/day = [(1) × (2)] + (3)
WC (single flush)	Flush volume (litres)		4.42	0.00	
WC (dual flush)	Full flush volume (litres)		1.46	0.00	
	Part flush volume (litres)		2.96	0.00	
WCs (multiple fittings)	Average effective flushing volume (litres)		4.42	0.00	
Taps (excluding kitchen/utility room taps)	Flow rate (litres/ minute)		1.58	1.58	
Bath (where shower also present)	Capacity to overflow (litres)		0.11	0.00	
Shower (where bath also present)	Flow rate (litres/ minute)		4.37	0.00	
Bath only	Capacity to overflow (litres)		0.50	0.00	
Shower only	Flow rate (litres/ minute)		5.60	0.00	
Kitchen/utility room sink taps	Flow rate (litres/ minute)		0.44	10.36	
Washing machine	Litres/kg dry load		2.1	0.00	
Dishwasher	Litres/place setting		3.6	0.00	
Waste disposal unit	Litres/use	If present = 1	3.08	0.00	
		If absent = 0			
Water softener	Litres/person/day		1.00	0.00	
	(5)	**Total calculated use = (Sum column 4)**			
	(6)	Contribution from greywater (litres/person/day) from Table B4.6			
	(7)	Contribution from rainwater (litres/person/day) from Table B5.5			
	(8)	Total water consumed = [(5) – (6) – (7) =			
	(9)	External water use			5.0
	(10)	**Total water consumed = (8) + (9)** (litres/person/day)			

Consumption from multiple fittings

B8 If terminal fittings with varying flow rates and capacities are specified (e.g. hot and cold taps with different flow rates; two types of shower), the average volume of water consumed should be calculated in Tables B2.1 to B2.7 and as follows.

1. Enter the full flow rate or volume of each type of fitting into column (a) of the relevant table.
2. If there are separate hot and cold water taps, enter the flow rate for each tap separately then calculate the average flow rate.
3. Calculate the total volume of water consumed per fitting type.
4. Calculate the average flow rate/volume of the fittings detailed.
5. For fittings other than WCs, enter the flow rate/volume of the fitting with the highest flow rate/volume into box (f).
6. For fittings other than WCs, calculate the proportionate flow rate/volume by multiplying the highest flow rate/volume by a factor of 0.7.

B9 If the average flow rate/volume is lower than the proportionate flow rate/volume, the proportionate figure must be entered into Table B1.

The proportionate figure limits the flow rate/volume that can be specified to 70% of the highest flow rate/volume. This reduces the benefit of specifying ultra low fittings to bring the average flow rate/volume down, where such ultra low fittings may not be acceptable to dwellings occupants.

B10 The figure which is the greater of the average or proportionate flow rate/volume should be used. This is so that, where the average flow rate/volume is significantly lower than the highest flow rate/volume specified, the calculation sets a limit for what figure can be assumed.

Table B2.1 Consumption calculator for multiple taps (excluding kitchen sink taps)

		(a)	(b)	(c)
Tap fitting type		Flow rate (litres/min)	Quantity (No.)	Total per fitting type = [(a) × (b)]
1				
2				
3				
4				
(d)	Total (Sum of all totals per fitting type)			
(e)	Average flow rate (litres/min) = [(e)/(d)]			
(f)	Maximum flow rate (litres/min)			
	Proportionate flow rate (litres/min) = [(f) × 0.7]			

Table B2.2 Consumption calculator for multiple baths

		(a)	(b)	(c)
Bath fitting type		Capacity to overflow (litres)	Quantity (No.)	Total per fitting type = [(a) × (b)]
1				
2				
3				
4				
(d)	Total (Sum of all quantities)			
(e)	Total (Sum of all totals per fitting type)			
(f)	Highest capacity to overflow (litres)			
	Proportionate capacity to overflow (litres) = [(f) × 0.7]			

Table B2.3 Consumption calculator for multiple taps (kitchen/utility room sink)

		(a)	(b)	(c)
Tap fitting type		Flow rate (litres/min)	Quantity (No.)	Total per fitting type = [(a) × (b)]
1				
2				
3				
4				
(d)	Total (Sum of all quantities)			
(e)	Total (Sum of all totals per fitting type)			
	Average flow rate (litres/min) = [(e)/(d)]			
(f)	Maximum flow rate (litres/min)			
	Proportionate flow rate (litres/min) = [(f) × 0.7]			

Table B2.4 Consumption calculator for multiple dishwashers

	(a)	(b)	(c)
Type of dishwasher	Litres per place setting	Quantity (No.)	Total per fitting type = [(a) × (b)]
1			
2			
3			
4			
(d)	Total (Sum of all quantities)		
(e)		Total (Sum of all totals per fitting type)	
		Average litres per place setting = [(e)/(d)]	
(f)		Highest litres per place setting	
		Proportionate litres per place setting = [(f) × 0.7]	

Table B2.5 Consumption calculator for multiple washing machines

	(a)	(b)	(c)
Type of washing machine	Litres per kg dry load	Quantity (No.)	Total per fitting type = [(a) × (b)]
1			
2			
3			
4			
(d)	Total (Sum of all quantities)		
(e)		Total (Sum of all totals per fitting type)	
		Average litres per kilogram of dry load = [(e)/(d)]	
(f)		Highest litres per kilogram of dry load	
		Proportionate litres per kilogram of dry load = [(f) × 0.7]	

Table B2.6 Consumption calculator for multiple showers

	(a)	(b)	(c)
Shower fitting type	Flow rate (litres/min)	Quantity (No.)	Total per fitting type = [(a) × (b)]
1			
2			
3			
4			
(d)	Total (Sum of all quantities)		
(e)	Total (Sum of all totals per fitting type)		
	Average flow rate (litres/min) = [(e)/(d)]		
(f)	Highest flow rate (litres/min)		
	Proportionate flow rate (litres/min) = [(f) × 0.7]		

Table B2.7 Consumption calculator for multiple showers

	(a)	(b)	(c)
WC type	Effective flushing volume* (litres)	Quantity (No.)	Total per fitting type = [(a) × (b)]
1			
2			
3			
4			
(d)	Total (Sum of all quantities)		
(e)	Total (Sum of all totals per fitting type)		
	Average effective flushing volume (litres) = [(e)/(d)]		

*Calculate the effective flushing volume for dual flush WCs as: (full flushing volume (litres) × 0.33) + (part flushing volume (litres) × 0.67)

B11 If more than one type of WC is provided, the average effective flushing volume should be calculated using Table B2.7. The average effective flush volume should then be entered into Table B1 in the row 'WCs (multiple fittings)'.

Ion exchange water softener

B12 Ion exchange water softeners use water in order to clean the resin that is used to absorb the mineral content of the dwelling's water supply. This cleaning process is referred to as the regeneration cycle, which occurs on a frequency dependent on the type of water softener specified and the hardness of the water. The water efficiency calculator looks at the water consumed per regeneration cycle that is beyond a level of good practice. The good practice level has been determined at a level of water consumption as a percentage of the water softener's total capacity which is set at 4%.

B13 The figure entered into the calculator is the volume of water consumed beyond this level of good practice to promote the use of more efficient water softeners. Where the water softener achieves a percentage that is equal to, or lower than this good practice benchmark figure, zero can be entered into Table B1 of the calculator for water softeners. The following formula is used to determine the litres of water consumed per person per day that is beyond the good practice level of 4%.

B14 Litres of water consumed per person per day beyond the 4% good practice level:

= [1 – (4 / (a))] × ((b) × (c))

Where:

(a) = % of total capacity* used per regeneration

(b) = Litres of water consumed per regeneration

(c) = Average number of regeneration cycles per day

*the total capacity is the volume of water that flows through the water softener between regeneration cycles. This volume is dependent on the hardness of the water and the total capacity used in this calculation needs to reflect the hardness of water specific to the geographic location of the specific development. This figure should be determined from manufacturer's product details.

B15 To calculate the litres of water consumed per person per day beyond the 4% good practice level, enter details of the water softener into Table B3. Where the result indicates zero or a negative figure, zero should be entered into Table B1 for water softeners. The number of occupants entered into the table should be based on two in the first bedroom and one in each additional room. Studio flats should assume for two occupants.

Table B3 Water softener consumption calculation

(a)	Total capacity used per regeneration (%)	
(b)	Water consumed per regeneration (litres)	
(c)	Average number of regeneration cycles per day	
(d)	Number of occupants served by the system	
(e)	Water consumed beyond 4% (litres/day) = [1 - [4/(a)]] × [(b) × (c)]	
(f)	Water consumed beyond 4% (litres/person/day) = [(e)/(d)]	

Greywater calculations

Greywater demand calculation

B16 If all WCs and/or washing machines are supplied with greywater, the greywater savings should be calculated. Copy the values for litres of water consumed per day from Column 4 of Table B1 and enter them in Table B4.6.

B17 If greywater is supplied to only a proportion of all WCs or washing machines, the average greywater demand from WCs should be calculated in Tables B4.1 and B4.2. Enter the details of each fitting in columns (a) to (c), then calculate the greywater demand in column (d).

Table B4.1 Greywater demand calculations – WCs

(a) Effective flushing volume (litres)	(b) Number of fittings present	(c) Quantity using greywater	(d) Greywater demand = [(a) × (c)]
(e) Total fittings = Sum of (b)		**(f)** Total greywater demand = Sum of (d)	
Average greywater demand from WCs = (f)/(e) × 4.42			

Table B4.2 Greywater demand calculations – washing machines

(a) Litres per kg	(b) Number of fittings present	(c) Quantity using greywater	(d) Greywater demand = [(a) × (c)]
(e) Total fittings = Sum of (b)		**(f)** Total greywater demand = Sum of (d)	
Average greywater demand from washing machines = (f)/(e) × 2.1			

Greywater collection calculations

B18 The volume of greywater collected should be calculated:

If greywater will be collected from all fittings, including the shower, bath and wash hand basin taps, the total volume of water consumed by the fittings, as calculated in Table B1, will be the total greywater collected. The sum of the consumption figures for fittings from which greywater is collected (from column 4 of Table B1) should be entered into Table B4.6.

If greywater will be collected from only a proportion of each type of fitting, such as taps, complete the calculations in Tables B4.3 to B4.5 and enter the results in Table B4.6.

Table B4.3 Greywater collection calculations – taps

(a) Litres per minute	(b) Number of fittings present	(c) Quantity supplying greywater	(d) Greywater supply = [(a) × (c)]
(e) Total fittings		**(f)** Total greywater demand	
= Sum of (b)		= Sum of (d)	
Average greywater supply from taps		= [(f)/(e)] × 1.58 + 1.58	

Table B4.4 Greywater collection calculations – showers

(a) Litres per minute	(b) Number of fittings present	(c) Quantity supplying greywater	(d) Greywater supply = [(a) × (c)]
(e) Total fittings		**(f)** Total greywater supply	
= Sum of (b)		= Sum of (d)	
Average greywater supply from showers (where bath present)		= [(f)/(e)] × 4.37	
Average greywater supply from showers (shower only)		= [(f)/(e)] × 5.60	

Table B4.5 Greywater collection calculations – showers

(a) Litres per minute	(b) Number of fittings present	(c) Quantity supplying greywater	(d) Greywater supply = [(a) × (c)]
(e) Total fittings = Sum of (b)		**(f)** Total greywater supply = Sum of (d)	
Average greywater supply from baths (where shower present)		= [(f)/(e)] × 0.11	
Average greywater supply from baths (bath only)		= [(f)/(e)] × 0.50	

Greywater savings calculations

B19 If greywater is reused within the dwelling, the savings from greywater should be calculated in Table B4.6, as follows.

1. Calculate the water to be recycled from Table B1 and/or using the method set out in section B18 where just a proportion of fittings are being collected from.
2. Determine the percentage of greywater collected to be recycled: refer to the details of the system, as specified by the manufacturer or system designer.
3. Determine the water demand of the fittings that will receive greywater. Such fittings may include WCs and washing machines, depending on the quality of the treated water. This is determined from the WC and washing machine consumption from Table B1 or Tables B4.1 and B4.2 in paragraphs B16 and B17.
4. Multiply the volume of water to be recycled with the percentage of recycled water (determined in b.) which will determine the actual volume of greywater available. Where the greywater supply is greater than the demand, the greywater savings are equal to the demand. Where the demand is greater than the greywater supply, the savings are equal to the supply.
5. Enter the greywater saving figure from Table B4.6 into Table B1.

Table B4.6 Greywater collection calculations – showers

(a) WCs, washing machines, bath, shower and wash hand basins usage (litres/person/day)	(b) Percentage of used water (a) to be recycled (%)	(c) Greywater available for use (litres/person/day) = (a) × [(b)/100]	(d) Greywater demand (litres/person/day) (from Table B1 or B4.2 and B4.3)	(e) Greywater savings (litres/person/day) Where (c) is greater than (d), (e) = (d), otherwise (e) = (c)

B20 If greywater will be reused in a communal greywater system that supplies more than one dwelling, Tables B4.1 to B4.5 should be used in the same way. The figures entered into Table B4.6 need to be entered on an individual dwelling basis and not using figures to reflect the communal system. The percentage collected figure will, however, need to be based on manufacturer or system designer details of the communal system specified.

Rainwater calculations

Rainwater collection calculations

B21 If rainwater will be used, the volume of rainwater that will be collected should be calculated using a method from **BS 8515**.

B22 For the intermediate approach from **BS 8515**, Table B5.1 should be completed, as follows.

1. Calculate the volume of water collected using the collection area, yield coefficient and hydraulic filter efficiency and average rainfall with guidance from **BS 8515**.
2. Calculate the daily rainwater collection in box (d) using the collection area, yield coefficient, hydraulic filter efficiency and rainfall.
3. Enter the number of occupants into box (e), which can be based on two occupants in the first bedroom and one occupant in each additional bedroom. A studio flat should assume two occupants.
4. If a communal rainwater system will be provided that supplies more than one home, Table B5.1 should be completed for the system as a whole.

Table B5.1 Rainwater collection calculation – BS 8515 intermediate approach

(a)	Collection area (m^2)	
(b)	Yield coefficient and hydraulic filter efficiency e.g. 0.7	
(c)	Rainfall (average mm/year)	
(d)	Daily rainwater collection (litres) = [(a) × (b) × (c)]/365	
(e)	Number of occupants	
(f)	Daily rainwater per person (litres) = [(d)/(e)]	

B23 For the detailed approach in **BS 8515**, Table B5.2 should be completed. Enter the total daily rainwater collection (litres) and the number of occupants. Then calculate the daily rainwater per person (litres).

Table B5.2 Rainwater collection calculation – BS 8515 detailed approach

(a)	Daily rainwater collection (litres)	
(b)	Number of occupants	
(c)	Daily rainwater per person (litres) = [(a)/(b)]	

B24 Table B5.2 is sufficient for evaluating the principles of the proposed system in the proposed development. To calculate the storage capacity and all other design and installation details, **BS 8515** should be followed.

Rainwater demand calculations

B25 If all of the WCs and/or washing machines will be supplied with rainwater, the consumption should be taken from Table B1.

B26 If rainwater will be supplied to only a proportion of fittings, such as to just one WC or washing machine, the rainwater demand should be calculated using Table B5.3 and/or B5.4.

Table B5.3 Rainwater demand calculations – WCs

(a)	(b)	(c)	(d)
Effective flushing volume (litres)	Number of fittings present	Quantity using rainwater	Rainwater demand = [(a) × (c)]
(e) Total fittings		**(f)** Total rainwater demand	
= Sum of (b)		= Sum of (d)	
Average rainwater demand from WCs		= [(f)/(e)] × 4.42	

Table B5.4 Rainwater demand calculations – washing machines

(a)	(b)	(c)	(d)
Litres per kg	Number of fittings present	Quantity using rainwater	Rainwater demand = [(a) × (c)]
(e) Total fittings		**(f)** Total rainwater demand	
= Sum of (b)		= Sum of (d)	
Average rainwater demand from		= [(f)/(e)] × 2.1	

Table B5.5 Rainwater saving calculations for new dwellings

		Litres per person per day
(a)	Rainwater collected	
(b)	Rainwater demand	
(c)	Rainwater savings* = [(a)/(b)] or (b)	

*where the amount collected (a) is greater than the demand (b), the rainwater savings (c) are equal to the demand (b)

Rainwater saving calculations

B27 Use Table B5.5 to calculate rainwater savings, as follows

1. Row a: enter the total volume of rainwater collected per person per day from Table B5.1 or Table B5.2, depending on the **BS 8515** approach followed.
2. Row b:
    i. where rainwater will be used in all WCs and/or washing machines: for the relevant fittings, sum the values for volume of water consumed from column 4 of Table B1, and enter the total rainwater demand
    ii. where rainwater will be used in only a proportion of WCs and/or washing machines, enter the total rainwater demand from box f of Table B5.3 and/or Table B5.4. (Sum the totals if both WCs and washing machines will use rainwater.) This figure should then be entered into Table B1 to calculate the internal water consumption.

Appendix C: Wholesome water

C1 The provisions on the wholesomeness of water made under section 67 of the Water Industry Act 1991 are set out below. This legislation is subject to Crown copyright protection and is available in its original form at www.legislation.gov.uk.

C2 For convenience, the relevant regulations and amendments concerned are reproduced here in a consolidated form with some deletions or additional text where it is considered it would assist comprehension. These are only extracts of the legislation, and in any case of doubt the original regulations and amendments should be consulted.

C3 The Schedules and Tables of these Regulations are not reproduced here.

Water Supply (Water Quality) Regulations 2000 (SI 2000/3184)

NOTE: in Wales the Water Supply (Water Quality) Regulations 2001 (SI 2001/3911) contain equivalent requirements.

Wholesomeness

4. (1) Water supplied:

a. for such domestic purposes as consist in or include, cooking, drinking, food preparation or washing; or

b. to premises in which food is produced,

shall, subject to paragraphs (4) and (5), be regarded as wholesome for the purposes of Chapter III [(quality and sufficiency of supplies) of Part III (water supply) of the Water Industry Act 1991], as it applies to the supply of water for those domestic purposes, if the requirements of paragraph (2) are satisfied.

(2) The requirements of this paragraph are:

a. that the water does not contain:

i. any micro-organism (other than a parameter listed in Schedule I) or parasite; or

ii. any substance (other than a parameter listed in Schedule I),

at a concentration or value which would constitute a potential danger to human health;

b. that the water does not contain any substance (whether or not a parameter) at a concentration or value which, in conjunction with any other substance it contains (whether or not a parameter) would constitute a potential danger to human health;

c. that the water does not contain concentrations or values of the parameters listed in Tables A and B in Schedule 1 in excess of or, as the case may be, less than, the prescribed concentrations or values;

d. that the water satisfies the formula [nitrate]/50 + [nitrite]/3 ≥1, where the square brackets signify the concentrations in mg/litre for nitrate (NO_3) and nitrite (NO_2).

(3) The point at which the requirements of paragraph (2), in so far as they relate to the parameters set out in Part I of Table A and in Table B in Schedule 1 are to be complied with, is:

a. in the case of water supplied from a tanker, the point at which the water emerges from the tanker;

b. in any other case, the consumer's tap.

(4) Water supplied for regulation 4(1) purposes shall not be regarded as wholesome for the purposes of Chapter III if, on transfer from a treatment works for supply for those purposes:

a. it contains a concentration of the coliform bacteria or E. coli parameter (items 1 and 2 in Part II of Table A in Schedule 1) in excess of the prescribed concentrations; or

b. it contains a concentration of nitrite in excess of 0.1mgNO_2/litre.

(5) Subject to paragraph (6), water supplied for regulation 4(1) purposes shall not be regarded as wholesome for the purposes of Chapter III if, on transfer from a service reservoir for supply for those purposes, it contains a concentration of the coliform bacteria or E. coli parameter in excess of the prescribed concentrations.

(6) Water transferred from a service reservoir for supply for regulation 4(1) purposes shall not be regarded as unwholesome for the purposes of Chapter III because the maximum concentration for the coliform bacteria parameter is exceeded if, as regards the samples taken in any year in which the reservoir in question is in use, the results of analysis for that parameter establish that in at least 95% of those samples coliforms were absent.

Private Water Supplies Regulations 2009 (SI 2009/3101)

NOTE: The Private Water Supplies (Wales) Regulations (SI 2010/66) which apply in Wales contain equivalent requirements.

Wholesomeness

4. Water is wholesome if all the following conditions are met:

a. it does not contain any micro-organism, parasite or substance, alone or in conjunction with any other substance, at a concentration or value that would constitute a potential danger to human health;

b. it complies with the concentrations or values specified in Part 1 of Schedule 1; and

c. in the water:

$$\frac{\text{nitrate (mg/litre)}}{50} + \frac{\text{nitrate (mg/litre)}}{3} \leq 1$$

Appendix D: Standards referred to

Standards

ANSI/NSF 41 Non-liquid saturated treatment system [2005 + A1:2007]

BS EN 257 Mechanical thermostats for gas-burning appliances [2022]

BS 417-2 Specification for galvanized low carbon steel cisterns, cistern lids, tanks and cylinders. Metric units [1987]

BS 853-1 Specification for vessels for use in heating systems. Calorifiers and storage vessels for central heating and hot water supply [1990 + A3:2011]

BS EN ISO 1043-1 Plastics. Symbols and abbreviated terms. Basic polymers and their special characteristics [2002]

BS EN 1111 Sanitary tapware. Thermostatic mixing valves (PN 10). General technical specification [2017]

BS EN 1287 Sanitary tapware. Low pressure thermostatic mixing valve.s. General technical specifications [2017]

BS EN 1329-1 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Unplasticized poly(vinyl chloride) (PVC-U). Specifications for pipes, fittings and the system [2020]

BS EN 1490 Building valves. Combined temperature and pressure relief valves. Tests and requirements [2000]

BS 1566-1 Copper indirect cylinders for domestic purposes. Open vented copper cylinders. Requirements and test methods [2002]

BS 1710 Specification for identification of pipelines and services [2014]

BS 3198 Specification for copper hot water storage combination units for domestic purposes [1981]

BS 4213 Cisterns for domestic use. Cold water storage and combined feed and expansion (thermoplastic) cisterns up to 500 l. Specification [2004]

BS 4800 Colour chart [2011]

BS 5918 Solar heating systems for domestic hot water. Code of practice for design and installation [2015]

BS 6283-2 Safety and control devices for use in hot water systems. Specifications for temperature relief valves for pressures from 1 bar to 10 bar [1991]

BS 6465-1 Sanitary installations. Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances [2006 + A1:2009]

BS 6465-2 Sanitary installations. Space recommendations. Code of practice [2017]

BS 6465-3 Sanitary installations. Code of practice for the selection, installation and maintenance of sanitary and associated appliances [2020]

BS 6700 Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages. Specification [2006 + A1:2009]

BS 7291-1 Thermoplastics pipe and fitting systems for hot and cold water for domestic purposes and heating installations in buildings. General requirements [2010]

BS 7291-2 Thermoplastics pipe and fitting systems for hot and cold water for domestic purposes and heating installations in buildings. Specification for polybutylene (PB) pipe and associated fittings [2010]

BS 7291-3 Thermoplastics pipe and fitting systems for hot and cold water for domestic purposes and heating installations in buildings. Specification for cross-linked polyethylene (PE-X) pipes and associated fittings [2010]

BS 7671 Requirements for electrical installations (IET Wiring Regulations 18th Edition) [2018 + A2:2022]

BS 8000-15 Workmanship on Building Sites Code of practice for hot and cold water services (domestic scale) [1990]

BS 8515 Rainwater harvesting systems. Code of Practice [2009]

BS 8525-1 Greywater system. Code of Practice [2010]

BS EN 200 Sanitary tapware. Single taps and combination taps for water supply systems of type 1 and type 2. General technical specifications [2023]

BS EN 1112 Sanitary tapware. Shower outlets for sanitary tapware for water supply systems type 1 and type 2. General technical specification [2008]

BS EN 12050-1 Wastewater lifting plants for buildings and sites. Lifting plants for wastewater containing faecal matter [2015]

BS EN 12050-2 Wastewater lifting plants for buildings and sites. Lifting plants for faecal-free wastewater [2015]

BS EN 12050-3 Wastewater lifting plants for buildings and sites. Lifting plants for wastewater containing faecal matter for limited applications [2015]

BS EN 12897 Water supply. Specification for indirectly heated unvented (closed) storage water heaters [2016 + A1:2020]

BS EN 12976-1 Thermal solar systems and components. Factory made systems. General requirements [2021]

BS EN 12977-1 Thermal solar systems and components. Custom built systems. General requirements for solar water heaters and combisystems [2018]

BS EN 15092 Building valves. Inline hot water supply tempering valves. Tests and requirements [2008]

BS EN IEC 60335-1 Household and similar electrical appliances. Safety. General requirements [2023 + A11:2023]

BS EN 60335-2-21 Household and similar electrical appliances. Safety. Particular requirements for storage water heaters [2021 + A1:2021]

BS EN 60335-2-35 Household and similar electrical appliances. Safety. Particular requirements for instantaneous water heaters [2016 + A2:2021]

BS EN 60335-2-73 Household and similar electrical appliances. Safety. Particular requirements for fixed immersion heaters [2003 + A11:2021]

BS EN 60730-2-9 Automatic electrical controls. Particular requirements for temperature sensing controls [2019 + A2:2020]

Appendix E: Documents referred to

Legislation

(available via www.legislation.gov.uk)

Building (Approved Inspectors etc.) Regulations 2010, SI 2010/2215

Building (Registered Building Control Approvers etc.) (England) Regulations 2024, SI 2024/110

Building Regulations 2010, SI 2010/2214

Food Safety and Hygiene (England) Regulations 2013, SI 2013/2996

Food Hygiene Rating (Wales) Regulations 2013, SI 2013/2903 W282

Gas Safety (Installation and Use) Regulations 1994, SI 1994/1886

Gas Safety (Installation and Use) (Amendment) Regulations 2018, SI 2018/139

Private Water Supplies Regulations 2009, SI 2009/3101

Private Water Supplies Regulations 2016, SI 2016/618

Private Water Supplies (Wales) Regulations 2010, SI 2010/66

Private Water Supplies (Wales) Regulations 2017, SI 2017/1041

Water Supply (Water Fittings) Regulations 1999, SI 1999/1148

Water Supply (Water Quality) Regulations 2000, SI 2000/3184

Water Supply (Water Quality) Regulations 2018, SI 2018/647

Workplace (Health, Safety and Welfare) Regulations 1992, SI 1992/3004

Water Industry Act 1991, c. 56

Health and Safety at Work etc. Act 1974, c. 37

Documents

BRE

(bregroup.com)

IP14/03 *Preventing Hot Water Scalding in Bathrooms: Using TMVs* [2003]

Chartered Institution of Building Services Engineers (CIBSE)

(www.cibse.org)

Commissioning Code M (CCM) *Commissioning Management* [2022]

Guide G *Public Health and Plumbing Engineering.* Third edition [2014]

KS1 *Reclaimed Water* [2005]

Solar Heating Design and Installation Guide [2016]

Department of Health and Social Care

Health Technical Memorandum 04-01: Supplement. *Performance specification D 08: thermostatic mixing valves (healthcare premises)* [2017]

Environment Agency

Harvesting rainwater for domestic uses: an information guide [2010]

Food Standards Agency

(food.gov.uk)

'Guidance for Food Businesses'. Available at: www.food.gov.uk/here-to-help

Health and Safety Executive (HSE)

(hse.gov.uk)

INDG192 *Welfare at work: Guidance for Employers on Welfare Provisions* [2007]

L8 *Legionnaires' Disease: Control of Legionella Bacteria in Water Systems. Approved Code of Practice and Guidance.* Fourth edition [2013]

L24 *Workplace Health, Safety and Welfare. Workplace (Health, Safety and Welfare) Regulations 1992. Approved code of practice.* Second edition [2013]

Historic England

(historicengland.org.uk)

'Building Regulations, Approved Documents and Historic Buildings'. Available online at: https://historicengland.org.uk/advice/technical-advice/building-regulations/

Water Regs UK

(www.waterregsuk.co.uk)

'Regulations & Guidance: England & Wales'. Available at: www.waterregsuk.co.uk/guidance/requirements-guidanc/

Water Regulations Guide. Third edition [2021]

Waterwise

(waterwise.org.uk)

Independent Review of the Costs and Benefits of Rainwater Harvesting and Grey Water Recycling Options in the UK. [2020]

List of Approved Documents

The following documents have been published to give guidance on how to meet the Building Regulations. You can find the date of the edition approved by the Secretary of State at www.gov.uk.

Approved Document A
Structure

Approved Document B
Fire safety
Volume 1: Dwellings

Approved Document B
Fire safety
Volume 2: Buildings other than dwellings

Approved Document C
Site preparation and resistance to contaminants and moisture

Approved Document D
Toxic substances

Approved Document E
Resistance to the passage of sound

Approved Document F
Ventilation
Volume 1: Dwellings

Approved Document F
Ventilation
Volume 2: Buildings other than dwellings

Approved Document G
Sanitation, hot water safety and water efficiency

Approved Document H
Drainage and waste disposal

Approved Document J
Combustion appliances and fuel storage systems

Approved Document K
Protection from falling, collision and impact

Approved Document L
Conservation of fuel and power
Volume 1: Dwellings

Approved Document L
Conservation of fuel and power
Volume 2: Buildings other than dwellings

Approved Document M
Access to and use of buildings
Volume 1: Dwellings

Approved Document M
Access to and use of buildings
Volume 2: Buildings other than dwellings

Approved Document O
Overheating

Approved Document P
Electrical safety – Dwellings

Approved Document Q
Security – Dwellings

Approved Document R
Infrastructure for electronic communications
Volume 1: Physical infrastructure and network connection for new dwellings

Approved Document R
Infrastructure for electronic communications
Volume 2: Physical infrastructure for high-speed electronic communications networks

Approved Document S
Infrastructure for the charging of electric vehicles

Approved Document T
Toilet accommodation

Approved Document 7
Materials and workmanship

The Building Regulations 2010, Approved Documents are available from:

RIBA Books

Online: www.ribabooks.com
Email: sales@ribabooks.com
Telephone: +44 (0)207 307 5355

ISBN 978 X XXXXXXXXX

DRAFT VERSION