

<b>Building Control Guidance Note</b>	Subject	<b>PART G – SANITATION, HOT WATER SAFETY AND WATER EFFICIENCY 2010</b>						<b>27</b>
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From the 6<sup>th</sup> April 2010 an updated and extended version of Part G is implemented, bringing in a number of new areas of control.

This guide updates you on the main changes – but it is recommended you download the actual document to obtain a complete understanding of the regulations requirements.

The new Regulation is broken down into 6 parts:

#### **G1 Cold Water Supply**

New requirements on supply of wholesome water for purposes of drinking, washing or food preparation. Also for the provision of water of a suitable quality to sanitary conveniences fitted with a flushing device.

#### **G2 Water Efficiency**

G2 and Regulation 36 of the Building Regulations 2010 set out new requirements on water efficiency in dwellings.

#### **G3 Hot Water Supply and Systems**

Sets out enhanced and amended provisions on hot water supply and safety, applying safety provisions to all types of hot water systems and a new provision on scalding prevention.

#### **G4 Sanitary Conveniences and Washing Facilities**

Sets out requirements for sanitary conveniences and hand washing facilities.

#### **G5 Bathrooms**

Set out requirements for bathrooms, which apply to dwellings and to buildings containing one or more rooms for residential purposes.

#### **G6 Kitchens and Food Preparation Areas**

Contains a new provision requiring sinks to be provided in areas where food is prepared.

The definition of a '*Controlled Service or Fitting*' has been amended and now includes a service or fitting subject to Schedule 1 requirements in respect of sanitation, hot water safety, water efficiency, drainage and waste disposal, combustion appliances and fuel storage, conservation of fuel or power and electrical safety.

### **Transitional Provisions**

The transitional provisions for the implementation of these regulations are such that you can continue to use the old Regulation G or if the previous Regulation G did not apply to your works, you will not have to comply with the new requirements in the following circumstances:

1. For projects covered by a current Building Notice or Full Plans submission where work has commenced on the before the 6<sup>th</sup> April 2010 and you have given the local authority notice of the works commencement ; OR
2. The work falls within Schedule 3 - self- certification schemes and exemptions from the requirement to give building notice or give full plans or Schedule 4 of the Building Regulations – Descriptions of works where no building notice or deposit of full plans is required (see separate Guide note); OR
3. Where the deposit of full plans is **not** required, if a contract for the proposed work had been entered into before 6<sup>th</sup> April 2010 the work will not be subject to the amended regulations so long as the work is commenced before 1<sup>st</sup> October 2010; OR
4. If you have a Full plans application deposited with the local authority before 6<sup>th</sup> April 2010 – you must have obtained a full approval or where a conditional approval has been previously granted you must ensure all conditions have been satisfied and the local authority has confirmed this in writing. ***The works must however commence before 6<sup>th</sup> April 2011.*** This applies whether or not the work departs from those plans.

## **REGULATION G1 – COLD WATER SUPPLY.**

(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 and 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.*

**G1(1) will be met if there is a reliable supply of wholesome water and its pressure and flow rate is sufficient for operation of the buildings sanitary appliances. Any plumbing installation must convey 'wholesome water' or 'softened wholesome water' to the sanitary appliances and locations specified in the requirement without waste, misuse, undue consumption or water contamination.**

The approved document then sets out what is considered to be 'Wholesome Water'.

### **Wholesome Water (All Buildings).**

Water supplied to the building by statutory water undertaken or licensed water suppliers through an installation complying with the Water Supply (Water Fittings) Regulations 1999 can be assumed to be 'Wholesome Water'. (The approved document's Annex 1 provides further explanation).

Alternatively, the water is considered to be wholesome if the water source meets the criteria set out in Private Water Supplies Regulations 2009 (again refer to Annex 1 for further explanation).

**G1(2) will be met if there is a reliable supply of water which is either wholesome, softened wholesome or of suitable quality having regard to risks to health and its pressure and flow rate is sufficient for the operation of the sanitary appliances. Any plumbing installation must convey water to the sanitary appliances and locations specified in the requirement without waste, misuse, undue consumption or contamination of wholesome water.**

The approved document then sets out what is considered to be 'Softened Wholesome Water'

### **Softened Wholesome Water.**

Wholesome water which has been treated by a water softener or a water softening process to adjust the content of hardness minerals may have raised sodium levels. Where the water, after this treatment, still complies with requirements for wholesome water it is still considered to be wholesome water.

***This water should not be connected to places where drinking water is drawn off or to sinks used for food preparation.***

### **Alternative sources of water**

Water treated to the high standards of wholesome water is not essential for all of the buildings water uses e.g. toilet flushing, irrigation etc.

A variety of alternative sources are available for water. These include:

1. Water abstracted from wells, springs, boreholes or water courses.
2. ***Harvested rainwater*** e.g. rainwater harvested from roofs or other suitable surfaces and collected and stored, where appropriately treated may be used in place of wholesome water for wc's, urinals, irrigation or washing machines.
3. ***Reclaimed greywater*** e.g. domestic wastewater (excluding faecal matter and urine), when appropriately treated, may be used in place of wholesome water for wc's, urinals, irrigation or washing machines.
4. Reclaimed industrial process water.

The approved document then sets out some guidance on the design of treatment systems for water from alternative water sources.

### **Design of treatment systems for water from alternative water sources.**

Systems should incorporate measures to minimise the impact on water quality of:

- a) failure of any component;
- b) failure to undertake any necessary maintenance;
- c) power failure where appropriate; and
- d) any other measures identified in a risk assessment.

***It is important to prevent confusion with ‘Wholesome Water’ that the pipework that conveys ‘Alternative Sourced’ water is adequately marked in accordance with WRAS Information and Guidance Note No. 9-02-05 - Marking and Identification of Pipework for Reclaimed (Grey water) systems and BS8515:2009 Rainwater Harvesting Systems Code of Practice.***

For detailed design guidance, it is recommended you read WRAS Information and Guidance Note No. 9-02-04 Reclaimed Water Systems and in BS 8515:2009 Rainwater harvesting systems.

Any system/unit used to supply dwellings with water from alternative sources should be subject to a risk assessment by the system designer and manufacturer, and appropriate testing carried out to demonstrate that any risks have been suitably addressed. A risk assessment should include the effect on water quality of system failure and failure to carry out necessary maintenance.

### **REGULATION G2 – 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.**

*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).

#### ***Water efficiency of new dwellings.***

**36 – (1) The potential consumption of wholesome water by persons occupying a dwelling to which this regulation applies must not exceed 125 litres per person per day, calculated in accordance with the methodology set out in this guide ‘The Water Efficiency Calculator for New Dwellings’.**

**(2) This regulation applies to a dwelling which is—**

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

#### ***Wholesome water consumption calculation.***

**37 – (1) Where regulation 36 applies, the person carrying out the work must give the local authority a notice which specifies the potential consumption of wholesome water per person per day, calculated in accordance with the methodology referred to in that regulation in relation to the completed dwelling.**

**(2) The notice shall be given to the local authority not later than five days after the work has been completed.**

This Regulation requires a maximum estimated water consumption of new dwellings, as calculated in accordance with the methodology set out in the 'Water Efficiency Calculator for New Dwellings'.

G2 will be met for new dwellings or individual flats (newly erected or created by a material change of use of existing buildings) if:

- (a) the design of cold and hot water systems estimated '*wholesome water consumption*' - calculated in accordance with the guidance set out in the 'Water Efficiency Calculator for New Dwellings' [water calculator link](#) and taking into account the use of any alternative sources of water provided in accordance with G1(2) should not greater than **125 litres/head/day of WHOLESOME WATER**; (This includes a fixed factor of water for outdoor use of 5 l/h/d).
- (b) sanitary appliances and white goods (washing machines and dishwashers) used in the design calculation undertaken to demonstrate compliance with paragraph (a) are provided and installed in the dwelling taking account of the provisions in the Approved Document; The water used by sanitary appliances and relevant white goods should be calculated using the manufacturer's declared value for water consumption of each of those appliances and white goods.
- (c) any alternative sources of water used in the design calculation to demonstrate compliance with paragraph (a) are supplied to the dwelling, taking account of other provisions in the Approved Document;
- (d) a record on the sanitary appliances and white goods (washing machines and dishwashers) used to meet the target and installed in the dwelling is provided along with sufficient other information enabling building owners or occupiers to maintain the building and its services so as to maintain the water efficiency of the building;
- (e) a record of the alternative sources of water used to meet the target and supplied to the dwelling is provided along with sufficient other information enabling building owners or occupiers to maintain the building and its services so as to maintain the water efficiency of the building.

**NOTE:**

- **Where a building consists of more than one dwelling e.g. block of flats, it should be designed so that the estimated wholesome consumption resulting from the design of the cold and hot water systems for each individual dwelling should be no greater than the target.**
- **Where it can be demonstrated that a dwelling meets the minimum waste efficiency standard in the Code for Sustainable Homes, it can be presumed to meet G2's requirements.**
- **It is advisable to avoid issues developing on completion that suitable steps are put in place as a designer to ensure the plumbing installer and owner are advised of the responsibilities to achieve the maximum '125 litres/head/day wholesome water consumption' for the dwelling.**

**Notification of Water Efficiency Calculation to Building Control.**

As a result of the changes you are required for each individual new dwellings (as constructed) either newly erected or created by a material change of use of an existing building, to submit to Building Control a notice specifying the calculated potential consumption of wholesome water per person per day.

This notice should be given to Building Control **not later than 5 days** after building work completion and until received no completion certificates can be issued.

**REGULATION G3 – HOT WATER SUPPLY AND SYSTEMS**

(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
- (c) 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 must 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 of a building within the meaning of regulation 5(a) or (b).

**G3 Hot Water Supply and Systems.**

**G3(1)**

(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
- (c) any sink provided in any area where food is prepared.

G3(1) a new requirement to provide heated wholesome or heated softened wholesome water to baths, showers, wash basins and sinks, which will be met if the installation conveys hot water to the sanitary appliances and locations specified in the requirements without waste, misuse or undue consumption of water (heated wholesome water or heated softened wholesome water means water when cold that was wholesome then heated and is supplied through a plumbing installation complying with the Water Supply (Water Fittings) Regulations 1999 (SI 1999/1148 as amended).

**Provision of Hot Water Supply**

You are required to provided a hot water supply to:

- (a) any WHB provided in association with a sanitary convenience in accordance with G4(2)
- (b) any WHB, bidet, fixed bath or shower in a bathroom in a dwelling or provided for rooms for residential purposes, provided in accordance with G5.
- (c) any sink in a food preparation area, provided in accordance with G6.

***You must also ensure that all pipework runs are installed in a way that minimises the transfer time between the hot water storage system and hot water outlets.***

(No other Building Regulation requirements to provide hot water to other washing facilities – these may be covered by other Legislation).

### **Legionella**

You are reminded in workplaces that the pipework systems should be designed to avoid the risk of creating conditions which can encourage the development of ‘Legionella bacteria’ – consult HSC publication Legionnaires’ Disease: Control of Legionella Bacteria in Water Systems. Approved Code of Practice and Guidance, L8 Health and Safety Commission 2000.

### **G3(2)**

*(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.*

G3(2) new requirement extending measures to ensure safe operation of all types of hot water systems. It includes controls and other safety devices to prevent the temperature exceeding 100°C and robust installation.

It 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 continues to safely contain the hot water:

- (a) during normal operation of the hot water system;
- (b) following failure to any thermostat used to control temperature; and
- (c) during operation of any of the safety devices fitted in accordance with paragraph G3(3).

### **G3(3)**

*(3) A hot water system that has a hot water storage vessel must incorporate precautions to—*

*Requirement G3(3) does not apply to a system which heats or stores water for the purposes only of an industrial process.*

*(a) prevent the temperature of the water stored in the vessel at any time exceeding 100°C;*

*(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.*

G3 (3) embodies the previous requirement G3, and applies it now to all hot water storage systems. Scope has also been extended to include primary thermal stores.

G3(3) will be met for a hot water storage system that has a vented storage vessel if:

- (a) the storage vessel has a suitable vent pipe connecting 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; and
- (b) in addition to any thermostat, either the heat source, or the storage vessel is fitted with a device that will prevent the temperature of the stored water at any time exceeding 100°C; and
- (c) the hot water system has pipework that incorporates a provision for the discharge of 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.

G3 (3) will be met for a hot water system that has an unvented storage vessel if:

- (a) the storage vessel has at least 2 independent safety devices, such as those that release pressure and so prevent the temperature of the stored water at any time exceeding 100°C in addition to any thermostat; and
- (b) the hot water system has pipework that incorporates a provision for the discharge of hot water from the safety devices to be visible at some point and safely conveys any hot water discharge from safety devices to an appropriate place open to the atmosphere where it will cause no danger to persons in or about the building.

**General to all types of systems.**

Hot water storage systems to be designed and installed in accordance with BS 6700:2006 + A1:2009 - Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages, or BS EN 12897:2006 Water Supply, Specification for indirectly unvented (closed) storage water heaters.

Hot water storage vessels to conform to BS 853-1: 1996 -Specification for vessels for use in heating systems. Calorifiers and storage vessels for central heating and hot water supply to BS1566-1 2002 - Copper indirect cylinders for domestic purposes. Open vented copper cylinders. Requirements and test methods, or BS 3198:1981 Specification for copper hot water storage combination units for domestic purposes, as appropriate, or other relevant national standards as appropriate.

**DESIGN AND INSTALLATION OF DIRECTLY OR INDIRECTLY HEATED HOT WATER STORAGE SYSTEMS.**

**Vented (open) Hot Water Storage Systems.**

Comprise of a vessel fed with cold water from a dedicated storage cistern. Expansion of the heater water is accommodated through the cold feed pipe. A vent pipe connecting the top of the vessel to a point open to atmosphere above the cold water storage cistern is provided as the safety devices.

Vented hot water storage systems should incorporate the following:

1. Adequately sized vent pipes (N.L.T 19mm internal diameter) connecting to the top of the hot water storage vessel to vent the storage vessel to open atmosphere above and over the level of the water in the cold-water storage cistern.
2. Any thermostat that controls the stored water temperature to a desired temperature, systems should incorporate:
  - (a) either:
    - (i) for all direct heat sources, a non-self-resetting energy cut-out to disconnect the supply of heat to the storage vessel in the event of the storage system overheating; **and;**
    - (ii) for all indirect heat sources, an overheat cut-out to disconnect the supply of heat to the storage vessel in the event of the stored water overheating so that the temperature of the stored water does not exceed 100°C; and
  - (b) an appropriate safety device for example, a temperature relief valve or a combined temperature and pressure relief valve (mechanically operated valve that opens to discharge water when a fixed (factory set) temperature or pressure is exceeded) to safely discharge the water in the event of significant over-heating.
3. Vent pipes must discharge over a cold storage cistern conforming to BS417-2:1987 - Specification for galvanised steel cisterns, cistern lids, tanks and cylinders or BS4213:2004 Cisterns for domestic use. Cold water storage and combined feed and expansion (thermoplastic) cisterns up to 500 litres.
4. The cold water storage cistern receiving the vent pipe discharges has to be supported on a flat, level, rigid platform, capable of safely withstanding the weight of the full cistern and fully supporting the cistern bottom over the whole of its area. The platform must extend minimum 150mm beyond the edge of the cistern maximum dimensions.

***Note: If replacing existing metal cistern or plastic cistern is replaced with a large plastic cistern, the existing support must be upgraded.***

5. Cisterns to be accessible for maintenance, cleaning and replacement.

**UNVENTED HOT WATER STORAGE SYSTEMS – ALL SYSTEMS.**

1. In addition to any thermostat provided to control the stored water temperature to a desired temperature, unvented hot water storage systems should incorporate a **minimum of 2** independent safety devices operating independently in series, acceptable approaches could be:
  - a) a non-self-resetting energy cut-out to disconnect the supply of heat to the storage vessel in the event of the storage system overheating;

**(Non-Self Resetting Energy Cut Out** is a device that interrupts heat supply to hot water storage vessel when a fixed (factory set) temperature is exceeded. If activated it should only be possible to reset it manually. **and**

- b) a temperature relief valve or a combined temperature and pressure relief valve (mechanically operated valve that opens to discharge water when a fixed (factory set) temperature or pressure is exceeded) to safely discharge the water in the event of serious overheating.

***Alternative approaches to the above are acceptable provided an equivalent degree of safety is achieved.***

2. Water heaters with a capacity of 15 litres or less that have appropriate safety devices for temperature and pressure will generally satisfy the requirements set out in G3(3).

#### **UNVENTED HOT WATER STORAGE SYSTEMS – SYSTEMS UP TO 500 LITRES CAPACITY AND 45kW POWER INPUT**

Comprises of a vessel fed with cold water from a supply pipe or dedicated storage cistern (without a vent pipe) and in which water is heated directly or indirectly. Water expansion when heated is accommodated internally or externally and the system is fitted with safety devices to prevent water temperatures exceeding 100°C, and other applicable operating devices to control primary flow, prevent backflow, control working pressures and accommodate expansion.

**Hot Water Storage System package** means a hot water storage system having safety devices fitted by the manufacturer, together with a kit containing other acceptable devices supplied by the manufacturer to be fitted by the installer.

**Hot Water Storage System Unit** means a hot water storage system having safety devices and all other applicable operating devices factory fitted by the manufacturer.

In addition to the minimum of 2 temperature activated safety devices as described above in ‘Unvented Hot Water Storage Systems – All Systems’, the following should be complied with:

1. 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.
2. Any unvented hot water storage system up to 500 litres and less than 45kW should be a proprietary hot water storage system unit or package complying with BSEN12897:2006 or BS 6700:2006 +A1:2009.
3. Any unvented water storage system unit or package should be indelibly marked with the following:
  - (a) Manufacturer's name and contact details.
  - (b) Model reference.
  - (c) Rated storage capacity of the storage water heater.
  - (d) System operating pressure and expansion valve operating pressure.
  - (e) Relevant Operating data on each of the safety devices fitted, and
  - (f) Maximum primary circuit pressure and flow temperature of indirect hot water storage systems, units or packages.
4. Additionally, a visible warning label should be indelibly marked on the hot water storage system, unit or package comprising of the following statements:

#### **WARNING TO USER**

- a) *Do not remove or adjust any component of this unvented water heater; contact the installer.*
- b) *If this unvented water heater develops a fault, such as 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 Building Regulations.*
- b) *Use only appropriate components for installation or maintenance.*

*Installed by: Name/ Address/ Telephone Number*

*Completion Date:*

**UNVENTED HOT WATER STORAGE SYSTEMS – SYSTEMS OVER 500 LITRES CAPACITY AND  
OVER 45kW POWER OUTPUT.**

In addition to the minimum of 2 temperature activated safety devices as described above in 'Unvented Hot Water Storage Systems – All Systems', the following should be complied with:

1. Systems over 500 litres (usually project bespoke designs) are not covered by third party accreditation and, therefore, must be designed to the safety requirements by an appropriately qualified engineer.
2. Any unvented hot water storage system having power input more than 45kW, but a capacity of 500 litres or less should be a proprietary hot water storage system unit or package, complying with BSEN 12897:2006 - Water Supply, Specification for indirectly heated unvented (closed) hot water storage systems or BS 6700:2006 +A1:2009 - Design, Installation, Testing and Maintenance of Services Supplying Water for Domestic Use within Buildings and their curtilages.

**SAFETY DEVICES****Non-Self-Resetting Energy Cut-Outs.**

1. May only be used where they instantly disconnect the storage vessels energy supply and where they comply with either:
    - (a) BSEN 60335-2-73: 2003 - Specification for safety of household and similar electrical appliances. Particular requirements. Fixed immersion heaters and BS EN 60730-2-9:2002 Automatic electrical controls for household and similar use. Particular requirements for temperature sensing control; or
    - (b) BS EN 257:1992 Mechanical thermostats for gas burning appliances.
  2. Where non-self-resetting energy cut-out operates indirectly on another device to interrupt the heat supply (e.g. it is wired up to a motorised valve or some other suitable device to shut off the flow to the primary heater) the energy cut-out to comply with relevant European Standard or the supplier or installer must demonstrate an equivalent performance.
- (Non-Self Resetting Energy Cut Out is a device that interrupts heat supply to hot water storage vessel when a fixed (factory set) temperature is exceeded. If activated it should only be possible to reset it manually.)*
3. Where an electrical device is connected to energy cut-out, e.g. relay or motorised valve, the device should operate to interrupt the energy supply if the electric supply is disconnected. If more than one energy cut-out is used, each non-self-resetting energy cut-out should be independent (e.g. each to have separate motorised valve and separate temperature sensor).
  4. For systems with more than 1 heat source, each heat source is to have a separate non-self-resetting energy cut-out.

**Temperature and Pressure Relief Devices.**

Where relevant appropriate temperature and pressure activated safety devices should be fitted in addition to a safety device such as an energy cut-out.

1. Temperature relief valves and combined temperature and pressure relief valves should not be used in systems which have no provision to automatically replenish the stored water (e.g. unvented primary storage vessels). In such case, a second non-self-resetting energy cut-out independent of the ones provided as described above in 'Unvented Hot Water Storage Systems – All Systems'.

*Temperature Relief Valve is a mechanically operated valve that opens to discharge water when a fixed (factory set) temperature is exceeded. Conforming to BS 6283-2:1991 - Safety and control devices for use in hot water systems. Temperature relief valves for pressures from 1 bar to 10 bar. Sized to give a discharge rating at least equal to the total power input to the hot water storage system. Reference should be made to Appendix F of BSEN 6283-2: 1991 or BSEN1490:2000*

*Combined Temperature and Pressure Relieve Valve is a mechanically operated valve that opens to discharge water when a fixed (factory set) temperature or a fixed (factory set) pressure is exceeded. Conforming to BSEN 1490:2000 - Building valves. Combined temperature and pressure relief valves. Tests and Requirements.*

2. In both units and packages, temperature relief valves, should be located directly on the storage vessel such that the stored water does not exceed 100°C.
3. In hot water storage system units and packages the temperature relief valve(s) should be:
  - (a) factory fitted and should not be disconnected other than for replacement, and
  - (b) not relocated in any other device or fitting installed.
4. The safety and performance of an unvented system is dependent on choice of an appropriate system for the location and correct installation of the system. Building owners and occupiers should, therefore, take care to choose installers who have the necessary skills to carry out this work, e.g. registered, competent persons scheme members or by the holding of current registered operative skills certification card for unvented hot water systems.

The installation of an unvented system is notifiable work and requires notification to Building Control before works commence. Building Control may then check to make sure the work is safe and meets current energy efficient requirements (other than Competent Person Scheme members).

### **Electric Water Heating.**

1. Electric fixed immersion heaters to conform with BS EN 60335-2-72:2003 - Household and similar electrical appliances safety. Particular requirements for fixed immersion heaters.
2. Electric instantaneous water heaters to conform with BS EN 60335-35:2002 - Specification for safety of household and similar electrical appliances.
3. Electric storage water heaters to conform with BS EN 60335-2-21:2003 - Household and similar electrical appliances. Safety. Particular requirements for storage water heaters.

### **Solar Water Heating.**

1. Factory made solar water heating systems to conform to BS EN 12976-1:2006 - Thermal solar systems and components. Factory made systems. General requirements.
2. Other solar water heating systems to conform with pr/EN/TS 12977-1:2008 Thermal solar systems and components. Custom built systems. General requirements for solar water heaters and combi systems, or BS 5918:1989 BSCP Solar heating systems for domestic hot water (further guidance available from CIBSE Guide G).
3. Where 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.
4. Some solar hot water systems operate at elevated temperatures and pressures – all components to be rated to the appropriate temperature and pressure.

### **DISCHARGE PIPES FROM SAFETY DEVICES.**

#### **Discharge Pipe D1.**

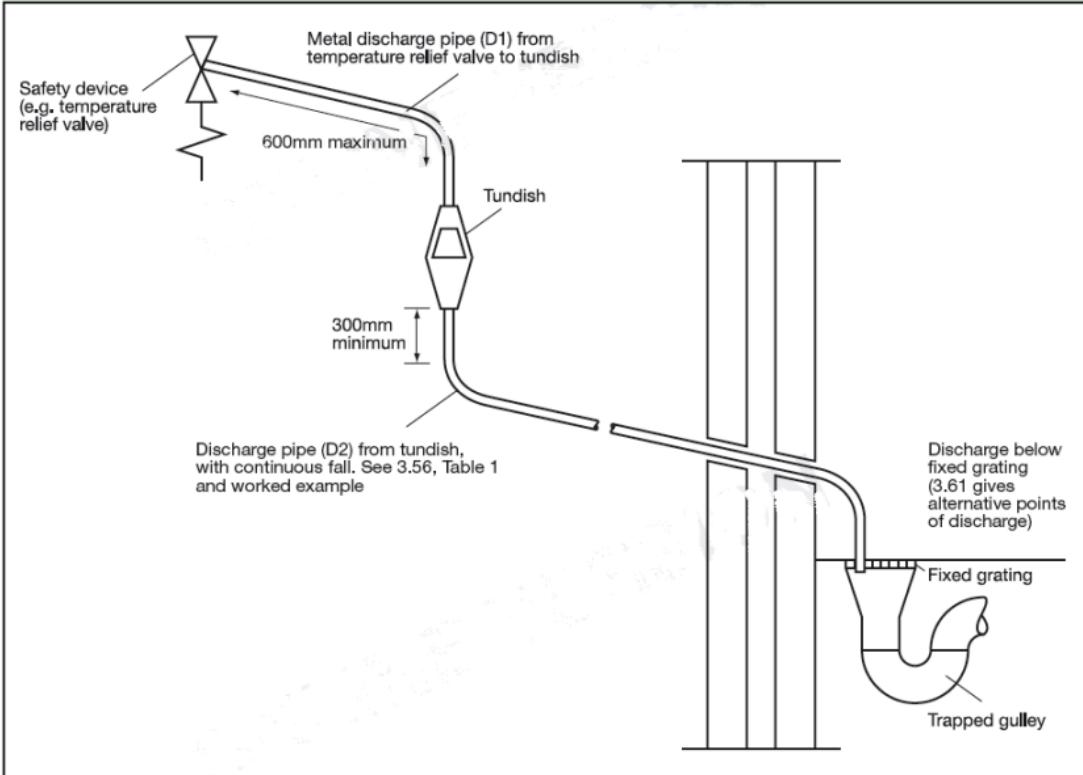
1. Each temperature relief valve or combined temperature and pressure relief valve should discharge either directly or by way of a manifold via short length of metal pipe (**D1**) to a tundish.
2. Diameter of discharge pipe (D1) to be NLT nominal outlet size of the temperature relief valve.
3. Where a manifold is used – must be sized to accept and discharge the total discharge from the connecting discharge pipes.
4. Where valve other than the temperature and pressure relief valve from a single unvented hot water system discharge by way of the same manifold that is used by the safety devices, the manifold should be factory fitted as part of the hot water storage system unit or package.

## Tundish.

A device installed in a discharge pipe from a valve, that provides an air break allowing safe discharge to a place of termination. Also provides a visible clue of a discharge and prevents backflow in the pipe system.

The Tundish(s) must be vertical, located in same space as unvented hot water storage system and 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 tundish. NOTE: To comply with Water Supply (Water Fittings) Regulations, the tundish should incorporate a suitable air gap.

**Diagram 1 Typical discharge pipe arrangement**



Extract from Approved Document G

Any discharge should be visible at the tundish; additionally where safety devices discharges may not be apparent (e.g. people with impaired mobility/vision) a suitable safety device that provides a warning should be considered, e.g. electronically operated.

## Discharge Pipe D2.

1. Discharge pipe (D2) from the tundish should:
  - (a) have vertical section of pipe at least 300mm long below the tundish before any elbows or bends in the pipework ; and
  - (b) be installed with a continuous fall thereafter (min 1 in 200)
2. Should be made of metal; or other material capable of withstanding the discharged water temperatures and is clearly and permanently marked to identify the product and performance standards.
3. D2 should be at least 1 pipe size larger than the nominal outlet size of safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9m long (i.e. for discharge pipes between 9m and 18m the equivalent resistance length should be at least two sizes larger than the nominal safety device outlet size, between 18 and 27m at least 3 sizes larger; and so on; bends must be taken into account in calculating the flow resistance see Dia. 1, Table 1 and worked example).

Alternative approach is to follow Annex D, section D.2 of BS 6700:2006 + A1:2009 - Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings.

**Table 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 3.51 and 3.58 and Diagram 1

**Note:** The above 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) having 4 No. 22mm elbows and length of 7m from the tundish to the point of discharge.

From Table 1:

Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from a G½ temperature relief valve is: 9.0m

Subtract the resistance for 4 No. 22mm elbows at 0.8m each = 3.2m

Therefore the maximum permitted length equates to 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 4 No. 28mm elbows at 1.0m each = 4m

Therefore the maximum permitted length equates to: 14m

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

### Extract from Approved Document G

4. Where a single common discharge pipe serves more than 1 system, it is to be at least 1 pipe size larger than individual discharge pipe (D2) to be connected.
5. Discharge pipe should not connect to a soil discharge pipe unless such pipe can withstand the high temperatures of discharge water; in which case it should:
  - (a) contain a mechanical seal, not incorporating a water trap to prevent foul air from venting through the tundish;
  - (b) be a separate branch pipe with no sanitary appliances connected to it;
  - (c) where branch pipes are plastic they should be either polybutalene (PB) to class S of BS 7291-2:2006 or cross linked polyethylene (PE-X) to Class S of BS 7291-3:2006 and;
  - (d) be continuously marked with a warning that no sanitary appliances can be connected to the pipe.

NOTES: (i) Plastic pipes are to be joined and assembled with fittings appropriate to the circumstances in which they are used as set out in BS EN ISO 1043-1:2002.

(ii) Where pipes cannot be connected to the stack it may be possible to route a dedicated pipe alongside or in close proximity to the discharge stack.

### Termination of Discharge Pipe.

Discharge pipe (D2) from tundish must terminate in a safe place with no risk to person in discharge vicinity.

E.g. (a) To trapped gully with pipe below gully grate but above the water seal.

(b) Downward discharges at low level, i.e. up to 100mm above external surfaces are acceptable provided a wire cage or similar guard is provided to prevent contact, whilst maintaining visibility; and

(c) Discharges at high level, e.g. into a **metal** hopper and **metal** downpipe with end of discharge pipe clearly visible or onto a roof capable of withstanding the water's high temperatures and within 3m of plastic guttering that would collect such discharges.

***WARNING - the discharge will consist of high temperature water and steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges.***

**G3(4) Prevention of Excessive Temperatures and Scalding.**

(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 of a building within the meaning of regulation 5(a) or (b).

G3 (4) a new requirement for prevention of scalding, through the installation of protective devices that limit the temperature of water supplies to fixed baths. It will be met if the hot water outlet temperature is appropriate for the appliance being served, and any device to fix the maximum temperature that can be supplied at the outlet cannot be easily altered by building users.

***It is only a requirement where a dwelling is erected or formed by a material change of use.***

**Prevention of Excessive Temperatures**

Where the operating temperature of domestic hot water in the storage vessel is capable of exceeding 80°C under normal operating conditions (a situation that may occur in vessels used as heat stores and those connected to solar heat collectors or solid flue boilers that do not have intervening controls between the boiler and the vessel containing the hot water) the outlet from the storage vessel should be fitted with a device, such as an inline hot water supply tempering valve in accordance with EN 15092, to ensure that the temperature supplied to the domestic hot water distribution system does not exceed 60°C.

**Prevention of Scalding**

1. The hot water supply temperature to a bath should be limited to a maximum of 48°C by using an in-line blending valve or other appropriate temperature control device, with a maximum temperature stop and a suitable arrangement of pipework.
2. In-line blending valves must comply with the relevant European Standard to demonstrate maximum 48°C cannot be exceeded in operation and that the product will fail safe (so maximum temperature cannot be exceeded if device fails i.e. not to discharge water more than 48°C maximum). Valves are not to be easily altered by the building owner. Examples suitable will be valves complying with BSEN 1111:1999 - Sanitary tapware. Thermostatic mixing valve (PN10). General technical specification or BSEN 1287:1999 - Sanitary tapware. Low pressure thermostatic mixing valves. General technical specification.
3. In-line blending valves and composite thermostatic mixing valves should be compatible with the sources of hot and cold water that serve them.
4. Length of supply pipes between blending valves and final outlets should be kept to a minimum in order to prevent colonisation of waterborne pathogens. If intermittent use of bath is likely, provisions must be made for high temperature flushing to pasteurise pipes and outlet fittings.

**NOTES:**

- (i) Additional guidance on in-line blending valves is found in BRE IP14/03 Preventing hot water scalding in bathrooms: using TMVs.
- (ii) In some buildings, e.g. care homes, in-line blending valves must meet additional requirements set out in NHS Estates model specification DO8.

**Installation.**

Installation workmanship to be in accordance with BS 8000-15:1990 - Workmanship on Building Sites Code of Practice for hot and cold water services (domestic scale).

**Commissioning of Fixed Building Services.**

1. Fixed building services including hot water systems and system controls must be installed and commissioned properly by testing and adjusting to ensure they use the minimum amount of fuel and power.
2. Commissioning includes setting-to work, regulation of its operation to achieve the specified performance, calibration, setting up and testing of associated automatic control systems; and recording of systems and performance testing.
3. Not all fixed building services need to be commissioned, e.g. systems with only on and off settings. In other cases, commissioning would be possible but in the specific circumstances would have no effect on energy use.
4. Commissioning must be done in accordance with a Secretary of State approved procedure. For new and existing dwellings this is the 'Domestic Heating Compliance Guide'; for buildings other than dwellings follow 'CIBSE Commissioning Code M'.
5. Commissioning must be carried out in such a way as not to prejudice compliance with any applicable health and safety requirements.

**Notice of Completion of Commissioning.**

Building Regulations - Regulation 44 requires person carrying out the works to provide to Building Control a notice that commissioning has been carried out in accordance with a procedure approved by the Secretary of State (for new and existing dwellings the 'Domestic Heating Compliance Guide'; for buildings other than dwellings 'CIBSE Commissioning Code M', unless testing and adjustment is not possible, or would not affect the energy efficiency of the fixed building service).

For works carried out under a Building Notice or Full plans, the notice of commissioning should be given no more than 30 days after the works completion. ***No completion certificate can be issued if the notice of commissioning is not received.***

***The giving of the commissioning notice to Building Control does not apply to jobs carried out under a 'competent person's scheme' (see links to further advice guides below).***

**G4 - SANITARY CONVENiences AND WASHING FACILITIES.**

- (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.

This was previously G1 under the old regulations, reference is made to approved codes of practice for workplaces that supports the Workplace (Health, Safety and Welfare) Regulations 1992 with regards to the provision of sanitary conveniences and washing facilities.

Additional guidance is also provided on separation of sanitary accommodation from places used for food preparation.

*Do not forget that Approved Document M also sets down requirements and details for sanitary provisions.*

**Scale of Provision and Layout in Dwellings.**

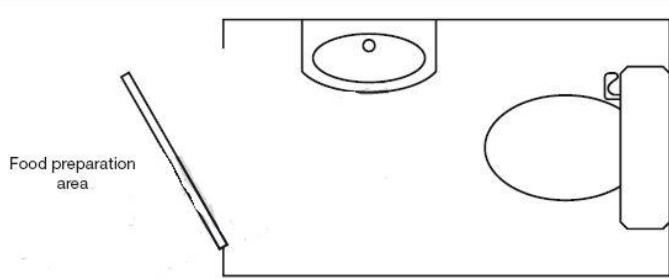
1. Any dwelling (house or flat) should have at least 1 sanitary convenience and associated hand washing facility, which can include a W.C. provided in accordance with Part M.
2. Where additional sanitary conveniences are provided, each should have an associated hand washing facility.
3. Hand washing facilities should be located in:
  - (a) the room containing the sanitary convenience; or
  - (b) an adjacent room or place that provides the sole means of access to the room containing the sanitary convenience (**provided the room is not used for food preparation**).
4. A place containing a sanitary convenience **and/or** associated hand washing facilities should be separated by a door from any place used for food preparation (including a kitchen).

For dwellings -a room containing both a sanitary convenience and a wash hand basin does not need a separation lobby between this room and a kitchen or food preparation area (see diagram 2).

The layout for a room containing its associated hand washing facilities is accessed before entry to a food preparation area, and is separated from that area by a door (see diagram 3).

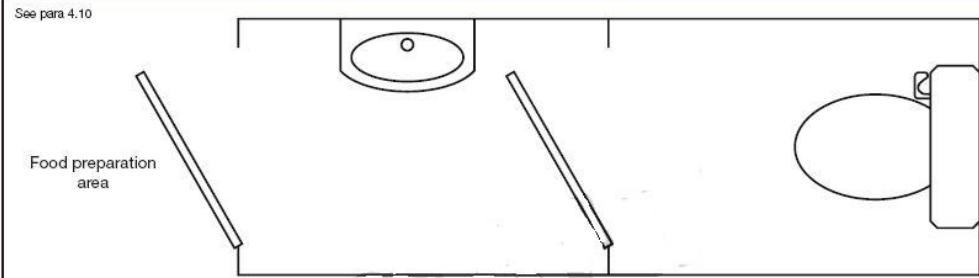
**Diagram 2 Separation between hand washbasin/WC and food preparation area – single room**

See para 4.10



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

See para 4.10



Extract from Approved Document G

5. For taps on sanitary appliances - HOT TAP TO BE ON THE LEFT.
6. BS6465-2:1996 - Sanitary installations. Code of practice for space requirements for sanitary appliance give guidance on activity space design around sanitary appliances.

**DEFINITIONS**

Sanitary Accommodation - means a room containing a WC or urinal whether or not it also contains other sanitary appliances. Sanitary accommodation containing 1 or more cubicles counts as a single space if there is free circulation of air throughout the space.

Sanitary Convenience - means WCs and urinals.

Kitchen - means a room or part of a room, which contains a sink and food preparation facilities.

### Scale of Provision and Layout in Buildings other than Dwellings.

1. The minimum number of sanitary conveniences to be in accordance with Approved Code of Practice (ACOP) for workplaces that support the Workplace (Health, Safety and Welfare) Regulations 1992.
2. Remember Approved Doc M also provides guidance on sanitary conveniences provisions. Such accommodation may form part of the total number of sanitary conveniences provided within a building.
3. Reference for Sanitary Convenience provisions to building types not set out in 1 above or in those workplaces where applicant wishes to provide more than the minimum recommended in the Approved Code of Practice (ACOP) for example, to deliver equivalent provision for men and women – refer to further guidance in BS 6465-1:2006 +A1:2009 Sanitary Installations. Code of Practice for the design of sanitary facilities and scales of sanitary and associated appliances.

Additional guidance on WHBs associated with sanitary conveniences in food preparation areas can be found in the Food Standards Agency's Code of Practice Food Hygiene – a guide for businesses.

For workplaces, the number, type and siting of sanitary conveniences, including separate provisions for men and women and the separation of a place containing a sanitary convenience and/or associated hand washing facilities and a workplace are also subject to the Workplace (Health, Safety and Welfare) Regulations 1992. Refer to Code of Practice issued with these Regulations.

4. A sanitary convenience may be provided in:
  - (a) a self-contained room which also contains hand washing facilities;
  - (b) in a cubicle with shared hand washing facilities located in a room containing a number of cubicles;
  - (c) in a self-contained room with hand washing facilities provided in an adjacent room.
5. Urinals. WC cubicles and hand washing facilities may be in the same room.
6. A place containing a sanitary convenience and/or associated hand washing facilities should be separated by a door from a food preparation area (including a kitchen)
7. For taps on sanitary appliances - HOT TAP TO BE ON THE LEFT.
8. BS6465-2:1996 - Sanitary installations. Code of practice for space requirements for sanitary appliance give guidance on activity space design around sanitary appliances.

### Chemical and Composting Toilets.

These can be used where:

- (a) suitable arrangement can be made for the disposal of the waste either on or off site; and
- (b) the waste can be removed from the premises without carrying it through any living space or food preparation areas (including a kitchen); and
- (c) no part of the installation would be installed in any places where it might be rendered ineffective by the entry of floodwater.
- (d) they comply with SI/NSF 41-1999 - non-liquid saturated treatment system.

Note - Composting toilets should not be connected to an energy source other than for purposes of ventilation or sustaining the composting process.

### Discharges to Drains.

1. Any WC fitted with flushing devices or urinal fitted with a flushing apparatus must discharge to adequate system of drainage.
2. A WC fitted with a macerator and pump may be connected to small bore drainage system discharging to a discharge stack if:
  - (a) there is also access to a WC discharging directly to a gravity system; and
  - (b) the macerator and pump meets the requirement of BS EN 12050-2:2001 Waste water lifting plans for buildings and sites. Principles of construction and testing. Lifting plants for faecal-free waste water or BS EN 12050-3:2001 Waste water lifting plans for buildings and sites. Principles of construction and testing. Lifting plants for waste water containing faecal matter for limited applications.

**NOTE: GREY WATER RECYCLING** – where used, lower overall flows are to be expected and drainage design must allow for this. Particularly relevant at head of the drain where only one building is connected to the drain.

## G5 – BATHROOMS.

G5. A bathroom must be provided containing a washbasin 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.

### Scale of Provision and Layout in Dwellings.

1. Any dwelling (house or flat) must have at least 1 bathroom with a fixed bath or shower, and a WHB. (*Hot taps on the LEFT*).
2. Guidance on the provision of activity space around sanitary appliances is given in BS 6465-2:1996 Sanitary installations: Code of Practice for space requirements for sanitary appliances.

### Scale of Provision and Layout in Buildings with Rooms for Residential Purposes.

1. The number of fixed baths or showers and WHBs in buildings with rooms for residential purposes should be in accordance with BS 6465-1:2006 and A1:2009 Sanitary installations. Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances.

### Discharges to Drains.

1. Any sanitary appliance used for personal washing should discharge through adequate drainage system to main drainage.
2. A sanitary appliance used for personal washing fitted with a macerator and pump may be connected to a small bore drainage system discharging to a discharge stack if:
  - (a) there is also access to washing facilities discharging directly to a gravity system; and
  - (b) the macerator and pump meets the requirements of BS EN 12050-2:2001 – waste water lifting plans for buildings and sites. Principles of construction and testing. Lifting plants for faecal-free waste water.

Sanitary appliance - means WC, urinal, bath, shower, WHB, sink, bidet and drinking fountain (composting toilet waterless urinal included).

## G6 – KITCHENS AND FOOD PREPARATION AREAS.

G6. A suitable sink must be provided in any area where food is prepared.

### Scale of Provision in Dwellings.

1. A sink should be provided in any kitchen or place used for preparation of food.

Sink – means receptacle used for holding water (for preparation of food or washing up) supplied through a tap and having a waste pipe.

Kitchen – room or part of a room containing a sink and food preparation facilities (handling/making and cooking food).

2. Where dishwasher is provided in a separate room (not the principal place for food preparation) an additional sink need not be provided in that room.

### Scale of Provision in Buildings other than Dwellings.

1. In all buildings other than dwelling there should a sink should be provided in any kitchen or place used for preparation of food.
2. In all buildings where Food Hygiene (England) Regulations 2006 apply, separate hand washing facilities may be needed (in addition to any hand washing facilities associated with WCs in accordance with Requirement G4).

### Discharges to Drains.

1. Any sink provided must discharge via suitable pipework to the main drainage system.

**Competent Person self Certification Schemes and Part G.**

Competent Person self certification schemes relevant to sanitation, hot water safety and water efficiency work, have been amended and additional competent persons scheme have been created – refer to Tameside web guide 26 - Competent Person schemes and exemption of minor works. For a complete list of the latest schemes refer to [www.communities.gov.uk](http://www.communities.gov.uk).

**Non-Notifiable Works and Schedule 3 of the Building Regulations 2010 (as amended).**

Additional works have been added to Schedule 2B, refer to Tameside 'Web Guide 26 - Competent Person Schemes and Exemption of Minor Works' for full details. The types of non-notifiable work relevant to the sanitation, hot water safety and water efficiency provisions are listed below:

- (i) In an existing hot water system, the replacement of any part which is not a combustion appliance, or the addition of an output device or control device. The work will, however, remain notifiable where commissioning is possible, and will affect the reasonable use of fuel and power. This is most likely to be where water heaters are being provided.
- (ii) Installation of a heating or hot water system connected to a solid fuel burning combustion appliance or its associated controls.
- (iii) Installation of a heating or hot water system connected to an electric heat source or its associated controls.
- (iv) The installation of a stand-alone, self-contained fix hot water appliance. This is restricted to a single appliance and any associated controls, and must not be connected to, or form part of, any other fixed building service. However, if any of the following apply, the work will remain notifiable building work.
  - The service is a combustion appliance.
  - Any electrical work associated with the installation is notifiable.
  - Commissioning is possible and would affect the service's energy efficiency, such as that of water heaters.
- (v) The replacement of a sanitary convenience with one that uses no more water than the one it replaces, a wash basin, sink, bidet, fixed bath, or a fixed shower bath but only where the work does not include any work to:
  - underground drainage.
  - the hot or cold water system or above-ground drainage which could prejudice the health and safety of any person on completion of work.
- (vi) Replacing any part or adding an output or control device to an existing cold water supply.
- (vii) Providing a hot water storage system that has a storage vessel with a capacity not exceeding 15 litres provided that any electrical work associated with the installation is also not notifiable.

**Exempt Buildings – Schedule 2 Building Regulations 2010 (as amended).**

Schedule 2 sets out the classes of exemptions. However, these exemptions have been removed in respect of some requirements of Part G where hot or cold water supply systems are shared with other buildings. This is to help ensure that the whole hot water or cold water system is safe in particular:

- (i) The requirements of Parts G1, G3(2) and G3(3) will apply to any greenhouse / conservatory which receives a hot or cold water supply from a source shared with or located inside a dwelling – refer to Tameside 'Web Guide Leaflet 1 - Domestic Conservatories or Porches'.
- (ii) The requirements of Parts G1, G3(2) and G3(3) will apply to any small detached building falling within Class VI of Schedule 2 and any extension falling within Class VII of Schedule 2 (includes conservatories under 30m<sup>2</sup>) which receives a hot or cold water supply shared with or located inside any building that is subject to the Regulations. – refer to Tameside 'Web Guide Leaflet 6 - Detached domestic single storey buildings – Sheds / Greenhouses/ Garage and attached Carports exempt from the Building Regulations'.

*NOTES: Regulations do not require the provision of hot or cold water systems to such exempt buildings, but if they are provided they must meet minimum hygiene and safety requirements in those Parts.*

**All other classes of building within Schedule 2 retain their exemptions from compliance with Part G.**