



Department
for Environment
Food & Rural Affairs



Llywodraeth Cymru
Welsh Government

Consultation on WC Suite Performance Specifications

Consultation document

Date: 8 August 2022



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Any enquiries regarding this publication should be sent to us at

Department for Environment, Food and Rural Affairs,
Water Services Team,
Ground Floor,
Seacole Building,
2 Marsham Street,
London,
SW1P 4DF

Or email at: drinkingwaterquality@defra.gov.uk

www.gov.uk/defra

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Annexes

- A Regulator Specifications and Test Code Sheets (A1 to A11)
- B Consultation questions

1. Introduction

The UK has a very high standard of drinking water quality. Standards for public supplies are set in the Water Supply (Water Quality) Regulations 2016 [England] and Water Supply (Water Quality) Regulations 2018 [Wales]. In 2021, public water supply compliance with these drinking water quality regulations was 99.97% in England, and 99.98% in Wales.

In addition, to ensure drinking water is safe up to the point of use, the Water Supply (Water Fittings) Regulations 1999 (the Regulations) regulate how water systems are designed, installed and operated. The Regulations require water fittings to be an appropriate quality and standard and suitable for the circumstances in which they are used. Regulator Specifications that provide detailed performance and verification can also be approved. The Regulations and Regulator Specifications are enforced by water companies within their respective areas.

In recent years a small number of examples of contamination of drinking water have come to light when water from WC cisterns re-entered (or backflowed into) a buildings' drinking water system. This consultation concerns proposed changes by the UK Government and Welsh Ministers to the WC Suite Performance Specification, the Specification on the Prevention of Backflow and other associated Regulator Specifications referred to as test code sheets (TCS). The changes are to address these incidents of backflow and to reflect innovations in the design of WC suites.

We will also use the consultation to gather evidence on faulty toilet valves causing a loss of water. We want to understand peoples' views and see what might be done to enable manufacturers to improve the products to meet consumers performance expectations.

2. Responding to this consultation

This consultation starts on 8 August 2022 and closes on 3 October 2022. This is an 8-week consultation.

We strongly encourage responses through Defra's Citizen Space consultation hub, an online consultation tool. Consultations receive a high level of interest across many sectors and using the online tool assists our analysis of responses, enabling more efficient and effective consideration of issues. The consultation can be completed online via Citizen Space: <https://consult.defra.gov.uk/drinking-water-quality/wc-suite-performance-specifications>.

However, responses can be sent by email or post. We must receive these responses by 3 October 2022. In your response please state: Your name; your email address; your type of organisation and its name; the size of the organisation you represent; the region or country you are based in; whether you would like your response to be confidential; and, your interest in the consultation.

Please send responses by email to drinkingwaterquality@defra.gov.uk, or in writing to WC Suite Performance Specifications Consultation, Department for Environment, Food and Rural Affairs, Water Services Team, Ground Floor, Seacole Building, 2 Marsham Street, London, SW1P 4DF.

If you have any queries on the consultation, need a hard copy of the document or need a Welsh language version, please email or write to us at the above addresses.

2.1 Audience

Responses to this consultation are welcomed from:

- businesses who manufacturer, assemble or sell WC suites or associated components,
- businesses who test water fittings,
- water companies as enforcers of the Regulations,
- other organisations such as professional and membership organisations, consultants who have an interest in specifying, designing, maintaining water systems and plumbing fittings.

2.2 Geographical scope

This consultation applies to England and Wales. The revised Regulator Specifications are relevant to the compliance of certain water fittings, in Scotland with the Water Supply (Water Fittings) (Scotland) Byelaws 2014 and in Northern Ireland with the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009.

The call for evidence on leaking toilets is predominantly seeking evidence from England and Wales but comments would be welcome from anywhere in the UK.

2.3 Body responsible for the consultation

This consultation is being carried out by Defra's Drinking Water Quality team on behalf of the UK Government and Welsh Government.

2.4 Compliance with consultation principles

This consultation is being conducted in line with the Cabinet Office "Consultation Principles". These can be found at:

<https://www.gov.uk/government/publications/consultation-principles-guidance>.

If you have any complaints about the consultation process, please address them by email to: consultation.coordinator@defra.gov.uk, or by post to: Consultation Coordinator, Second Floor, Foss House, Kings Pool, 1 to 2 Peasholme Green, York, YO1 7PX.

2.5 Confidentiality and data protection information

This consultation process has been planned to adhere to the Consultation Principles issued by the Cabinet Office.

Information provided in response to this consultation, including personal data, may be published or disclosed in accordance with the access to information regimes these are primarily the Environmental Information Regulations 2004 (EIRs), the Freedom of Information Act 2000 (FOIA) and the Data Protection Act 2018 (DPA). We have obligations, mainly under the EIRs, FOIA and DPA, to disclose information to particular recipients or to the public in certain circumstances.

This consultation is done in partnership with the Welsh Government. As a result of this, responses may be shared, analysed and reviewed by colleagues in Defra and the Welsh Government.

If you want the information that you provide to be treated as confidential, please be aware that, as a public authority, the Department is bound by the Freedom of Information Act and may therefore be obliged to disclose all or some of the information you provide. In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential.

If we receive a request for disclosure of the information, we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the Department.

A summary of responses to this consultation will be published on the government website but will not include personal names, addresses or other contact details. An annex to the consultation summary will list all organisations that responded. Defra may also publish some or all of the content of your response to this consultation.

Please answer Questions 1-8 for this section (see Annex B)

3. Consultation proposals

3.1 Background

As explained in section 1, the Water Supply (Water Fittings) Regulations 1999 (the Regulations) regulate how water systems are designed, installed and operated. Scotland and Northern Ireland have their own equivalent byelaws and regulations as noted in section 2.2. Regulator Specifications provide detailed performance, verification and in some cases installation requirements. The Regulations make it an offence to install, or have the intention of installing, fittings which do not comply with the Regulations. Water companies, as the enforcers of the Regulations, will inspect to check compliance.

Alongside the Regulations, some products are also required to comply with the Construction Products Regulation 2011, as retained in UK law. Manufacturers of these products must declare their performance to the relevant designated standard and affix the UKCA mark before placing it on the market. Two designated standards have been adopted which support compliance with the WC Suite Performance Specifications; BS EN 997:2012/AC:2012 WC pans and WC suites with integral trap; and BS EN 14055:2010 WC and urinal flushing cisterns. These standards cover the construction and flushing performance, however they do not cover all types of WC suites and do not set out any backflow prevention requirements.

Backflow prevention requirements are set in the Regulator Specifications as part of the Regulations therefore we need to retain these to ensure all WC suites perform as intended and public health is protected. We could revisit this in future if the designated standards are updated to include all types of WC suites and adequate backflow prevention.

3.1.1. Why the need for change

Water companies were alerted of backflow from reports of 'blue water' from consumers' taps, the colour appearing from the use of toilet hygiene blocks placed in WC cisterns. WC cisterns are not designed to store water of drinking water quality. Water can be stored for long periods between uses and/or chemicals used, therefore the deterioration due to stagnation of water or presence of chemicals could have potential health risks. Whilst the number of instances has been low (most recently the Drinking Water Inspectorate (DWI), the regulator of drinking water quality in England and Wales recorded 9 events in 2019 and 4 in 2021), water companies were keen to address the underlying cause rather than only correcting the individual cases.

An industry group was established made up of representatives from the bathroom manufacturing industry, the water industry and water fittings test facilities and approval schemes, as well as Defra and the DWI. This groups remit was to assess current requirements, conduct research into what would prevent backflow and propose a solution. Defra endorsed a short term voluntary agreement proposed by the industry group on the backflow prevention standards for new WC installations whilst a permanent solution was investigated.

3.1.2. Conclusions of the industry group

The key conclusions of the industry group were:

- That the Type AUK1 backflow prevention arrangement remains unchanged for non-WC applications.
- That 15 mm separation between the WC pan and cistern was suitable protection.
- There is no evidence linking the protection from backflow to the 300 mm separation currently required between the overflow and the WC pan.
- That correctly configured inlet valves offering Type AC and Type AG air gap arrangements offer suitable backflow protection within WC cisterns.

- In certain conditions and combinations of components, harmful fluids from the WC pan could flow into the WC cistern. To reduce any likelihood of this occurring a practical test was recommended.
- Certain types of inlet valves were being incorrectly identified as being Type AC and were a likely factor in the cases of backflow.
- It was crucial that combinations of WC pans, cisterns and components were tested together before use.

The industry group and Defra identified a number of other amendments that could be made to the Regulator Specifications to reflect innovations in the market.

3.2 Principal changes

To address the issue of fluids from a WC cistern backflowing into drinking water with the aim of protecting public health, we are proposing to:

- Introduce a WC specific backflow prevention arrangement,
- Make changes that apply appropriate test requirements where they are needed,
- Make changes to recognise innovations in the market.

The revised Specification on the Prevention of Backflow and the WC Suite Performance Specification will be the specifications approved by the regulator for the purposes of Schedule 2 of the Regulations.

3.2.1 Specification on the Prevention of Backflow

The industry group assessed the current requirements included in the Type AUK1 air gap arrangement. They found no link between the minimum height of the overflow (300 mm above the spillover level of the WC pan) and the prevention of contaminated water, from the WC pan, entering the WC flushing cistern. The group said they could not establish a definitive purpose for the 300 mm dimensional requirement within the Type AUK1 air gap arrangement and suggested it could be omitted.

The evidence gathered did not consider non-WC applications where this protection may be used. Therefore, we propose to keep the Type AUK1 air gap arrangement and create a new backflow prevention arrangement specifically for use with flushing cisterns and WC suites, called Type AUKWC air gap.

We wish to provide greater flexibility than that in Type AUK1, which would also be beneficial to more modern designs, and are proposing that it would incorporate either a Type AG or a Type AC air gap and that the separation from the spillover level of the receiving WC pan is measured to the internal residual fluid level (which is the water level that remains after the flushing valve is removed).

The research did identify an increased chance of back pressure occurring, with some component combinations, when the WC is flushed. It did not definitively conclude whether

contaminated water, from the WC pan, would be drawn back into the flushing cistern (which, if backflow occurred from the cistern could end up in a buildings drinking water system) but testing showed certain combinations of fittings were more susceptible than others. The industry group suggested this could be minimised by appropriate testing and offered a test methodology.

Taking a precautionary approach, we propose to apply an additional test targeted to specific component combinations to minimise instances where there may be a greater risk. This test will only apply when the following qualifying characteristics are present within the WC suite arrangement:

- the water inlet valve forms a Type AC air gap; and,
- the flushing device is not a diaphragm operated siphon; and
- the overflow discharge is not external to the receiving vessel (for example it discharges into the WC pan or the flush pipe).

Those creating whole WC suites (manufacturers, retailers or others) that include all of these characteristics will have to undertake an additional test to show that it is safe.

We propose to update the Specification on the Prevention of Backflow (Annex A1) to include:

- A new definition for a “flushing device”,
- A new interpretation describing the “Type AUKWC - Air gap with interposed flushing cistern”,
- A new entry which details the maximum fluid categories a Type AUKWC may protect against.

A new test code sheet (2213.20 Type AUKWC dimensional and internal overflow compatibility (Annex A2)) is proposed which sets out the methodology for verifying the dimensions of Type AUKWC air gap and the component compatibility testing.

Please answer Questions 9 and 10 for this section (see Annex B)

3.2.2 WC Suite Performance Specification

The industry group commented that some test code sheet test methods were duplicated in the WC Suite Performance Specification (Annex A3) but that, in places, they were not identical which created ambiguity.

To simplify, aid clarity and to minimise disruption with test houses, who use the test code sheet methodologies in their UKAS testing accreditation, we are proposing to remove test methodologies from this Regulator Specification. Instead, where possible, setting out the requirement to be met; the test method to be applied; and how results are to be shown.

We want to clarify the inlet valve performance requirements and remove prescriptive requirements which will allow the use of inlet valves conforming to newer versions of British Standard BS 1212.

We have proposed renaming the “Backflow prevention” clause to “Anti-siphonage capability” to better reflect its purpose and to minimise confusion with the backflow prevention requirements of Paragraph 15 of Schedule 2 to the Regulations.

We also want to clarify the definition for joints and reaffirm that joints below the critical water level within a WC flushing cistern are not allowed. If they are below, it offers a potential route for contamination to enter drinking water supplies. The critical water level forms the datum level from which the protective air gap will be determined. A new test code sheet (2213.21 Joints below critical water level (Annex A4)) is proposed.

Our proposals also make changes to be less prescriptive in the heights an overflow must be within flushing cisterns. We propose raising the upper limit to align with a relaxation Defra granted in 2000 and by Welsh Ministers in 2001 and reducing the lower limit to enable earlier detection of impending overflows under fault conditions. Test code sheet 5011.7 Warning pipe and overflow provision (Annex A5) will be updated to reflect this.

Finally, we are proposing to withdraw test code sheet 5011.5 Measurement of dimension overflow (Annex A6). It becomes redundant as the requirements will not align with those we are proposing elsewhere and leaving in place could create ambiguity and confusion.

Please answer Question 11 for this section (see Annex B)

3.2.3 Type AC air gap

During investigations it was identified that inlet valves were being incorrectly attributed as being Type AC. To remove ambiguity, we are proposing to add additional clarity within test code sheet 2213.15 Type AC dimensional (Annex A7) that a Type AC air gap is a non-mechanical arrangement which has a permanently open air port. As a precautionary measure we are proposing that the air port has a minimum dimension of not less than 4 mm, which are specified in other devices using air inlet arrangements. Its purpose is to ensure the effective operation of the anti-siphoning feature during fault conditions.

To provide additional clarity when verifying Type AC air gaps we are proposing to incorporate details of the overflow arrangements bringing it in line with other Regulator Specifications for air gap arrangements such as the Type AG.

Please answer Question 12 for this section (see Annex B)

3.3 Minor corrections and changes

We are also proposing other changes to reflect recent innovations. Where possible we have placed a focus on performance rather than descriptive characteristics to allow a

greater range of components to be installed, provide flexibility and allow future innovation. Manufacturers of such products may need to undertake some testing to show compliance, but it will allow the products to be lawfully installed under the Regulations.

We also identified transcription errors, inaccuracies and differences between the Regulator Specifications and industry practices. We are proposing minor amendments and, where necessary, have updated the relevant Regulator Specifications and test code sheets.

The test code sheets which are affected by these changes are 1511.2 Flush Rate (Annex A8); 1512.12 Wash of bowl (Annex A9); 1611.16 Liquid contaminant and dye retention (Annex A10); and 2212.3 Type AG Vacuum and dimensional (Annex A11).

Please answer Questions 13 and 14 for this section (see Annex B)

4. Impacts and evidence

4.1 Monetised costs

We have estimated that the changes proposed will have a gross cost to business of £3.51 million, in the worst case.

When calculating the costs and benefits we have assumed that: all products on the market will comply with the changes; and, that third party test facilities will include any costs for testing to the new and/or updated test methods as part of the cost of testing for example, new testing equipment and accreditation by the UK Accreditation Service.

We have assessed costs based on the number of component parts or WC suites which we believe will need altering and testing to comply with the proposed changes as well as costs involved in familiarisation with the changes. The worst case assumes the greatest number of products. The best case is a 1/3 of those identified in the worst case and there is a mid point between the two.

Most of the costs relate to backflow protection changes which will prevent contamination and protect human health. Other amendments to reflect current component / WC designs will result in testing costs but, being able to demonstrate compliance with the Regulations to enforcers will have long-term benefits to businesses and their reputations.

Table 1 summarises the total estimated costs rounded to the nearest hundred pounds. These will predominantly fall to manufacturers but also others such as retailers who assemble individual parts to form a whole WC suite. All costs and benefits are one-off as businesses transition into compliance with the new or updated Regulator Specifications. There will be no additional ongoing costs and benefits.

Table 1 Total estimated monetised cost impact

Impacts	Worst case	Mid-point	Best case
Total costs impact	£3,510,100	£2,340,500	£1,170,300

Table 2 provides a detailed breakdown relating to the proposed introduction of the Type AUKWC backflow prevention arrangement; and changes to inlet valves which could form a Type AC air gap such as ensuring a minimum air inlet hole size and eliminating joints below the critical water level.

Table 2 Detailed breakdown of estimated monetised costs

Regulator specification and description of change	Assumption(s) for worst case	Cost for worst case
<p>TCS 2213.15 - Type AC air gaps must have a minimum sized air inlet hole to prevent risk of siphoning</p> <p>TCS 2213.21 – There must be no joints below the critical water line</p>	<p>29% of inlet valve market is considered to potentially create a Type AC air gap.</p> <p>We assumed all these inlet valves have joints below the waterline, and of these 66% do not currently have the minimum hole size.</p> <p>Therefore, all the 29% will require redesigning and retesting (37 valves, redesigning at £50,000, retesting at £600).</p>	<p>Re-design estimate = £1,850,000</p> <p>Re-test estimate = £22,200</p>
<p>TCS 2213.20 – New Type AUKWC backflow prevention arrangement and compatibility test for certain component configurations within WC suites</p>	<p>28% of WCs on the market will use the new air gap arrangement and require an evaluation test to evidence compliance (1,290 at £575).</p> <p>9% of WCs on the market use components identified as needing the additional compatibility testing to verify safety (398 at £575).</p>	<p>Air gap testing estimate = £741,800</p> <p>Compatibility testing estimate = £228,900</p>
<p>WC Suite Specification 1.1 Inlet valve Performance – allowing inlet valves which could create a Type AG air gap to the newer BS 1212 standards to be installed.</p>	<p>14% of inlet valve market are of a type to the newer standard which have not already been tested ¹ (18 at £600).</p> <p>43% of inlet valve market are the new permitted types which have not already been tested ² (54 at £150).</p>	<p>Performance testing estimate = £10,800</p> <p>Anti-siphon testing estimate = £8,100</p>

Testing forms two parts Performance and Anti-siphon capability testing (TCS 2212.20)	Note, inlet valves which could create a Type AC air gap are accounted for in TCS 2213.15 above.	
TCS 1512.12 – Dimension added which will permit the installation of rimless toilet pans	19% of WCs on the market have rimless toilet pans. 1% of testing will be undertaken by third party test house (10 at £2,500) and 99% tested in-house by the manufacturer (self-declaration 874 at £225).	Testing estimate = £221,700
TCS 1611.16 – Water needs to be stirred before taking a sample to detect residual contamination ensuring uniform results	Effects all WC suites on the market, except those with rimless toilet pans which are accounted for in TCS 1512.12 above. 1% of testing will be undertaken by third party test house (38 at £100) and 99% in-house by the manufacturer (self-declaration 3,727 at £30).	Testing estimate = £115,700
TCS 5011.7 - Less stringent overflow height requirements and allowing non-circular overflows to be installed	97% of overflow products will need to re-confirm compliance with height requirements (3,652 at £20). 3% of overflow products are non-circular and full testing would be required (113 at £620).	Testing estimate = £73,100 Testing estimate = £70,100
Regulator Specification and TCS familiarisation costs	2½ hours per person at a mean hourly rate of £22.94 ³ (includes 22% non-wage labour cost uplift) requiring 7,311.25 hours. Costs based on business size: 127 Micro and Small (1 manager / engineer); 397.5 Medium (2 manager / engineer and 4 supervisor / test operative); 37.5 Large (3 manager / engineer and 8 supervisor / test operative).	Familiarisation estimate = £167,700
<p>Note 1. Inlet valves which are listed with a third-party product approval scheme are assumed to have successfully passed all appropriate performance tests.</p> <p>Note 2. Inlet valves which are listed with a third-party product approval scheme are not assumed to have had the anti-siphon test completed as detailed in the WC Suite Performance Specifications.</p> <p>Note 3. Annual Survey of Hours and Earnings, Office for National Statistics, SIC2007 Table 16.5a Hourly pay - Gross (£) - For all employee jobs: United Kingdom, 2021 - Gross (£). Closest sector (sector code 2342) Manufacture of ceramic sanitary fixtures.</p>		

4.2 Unmonetised benefits

The main benefit from the proposed changes is that all inlet valves will have a robust anti-siphoning feature and WC suites will be made with an appropriate backflow protection arrangement to avoid potential contamination of drinking water and protect public health.

Proposed changes to reflect recent innovations would have additional benefits for manufacturers who would be able to demonstrate compliance with the Regulations. For example, this would benefit inlet valves manufactured to latest versions of British Standards BS 1212, manufacturers of rimless WC pans, and products which do not meet current height requirements of overflow arrangements. As explained in section 4.1 there will be initial costs to manufacturers who may need to undertake some testing of products to show compliance but we expect these would be outweighed as beneficial to businesses in the long term by them not having to seek alternative component parts.

There are also some consequential benefits from the proposed amendments:

- Less material can be used in product manufacturing from relaxing minimum dimension requirements and there is opportunity for greater flexibility in component use which could potentially reduce the number of different products in manufacturers ranges.
- Potential for reducing the amount of water used/lost by lowering overflow heights which would enable earlier leak detection.
- Potential for greater range of inlet valves which include valves that temporarily provide a short delay before refilling a cistern so water is not lost as part of the previous flush.

However, none of these benefits have been calculated and monetised.

Please answer Question 15 for this section (see Annex B)

5. Call for evidence on leaking toilets

In a written ministerial statement of July 2021, Defra outlined the actions we committed to on reduce water demand in England. This work is part of the government's ambition for achieving clean and plentiful water. To secure future water resilience England needs to reduce its demand, which currently averages at 143 litres of water per person per day. An additional 4,000 million litres of water a day (Ml/d) will be needed in England between 2025 and 2050 to meet future supply pressures. Approximately, half of the water required will need to be delivered through demand management (reducing leakage, household and non-household consumption).

One issue which has been emerging in recent years is around water loss, classed as leakage, through toilets. These have been defined as leaky toilets and two potential failure points have been identified:

1. The inlet valve which fails to seal correctly, allowing water to continue to fill the flushing cistern, eventually creating an overflow of water to either an external overflow, or internally to the toilet pan;
2. The flushing valve at the base of the cistern (which controls the water flow during a flush) fails to seal correctly, allowing water to leak straight into the toilet pan.

A leaking toilet wastes between 215 and 400 litres of clean drinking water on average each day. It is estimated that around 5 – 8% of toilets are leaking, with around 400 million litres of water leaking from UK toilets every day. The evidence supports the perception that there is a higher proportion of leakage in modern WCs with flush valve mechanisms, and findings from research identified that the problem of leaking WCs may get worse in the future as older properties replace bathroom equipment with more modern WCs.

We received many responses on this issue in our 2019 consultation on measures to reduce personal water use. However, Government is seeking to further understand what actions we can take around testing and standards and to better enable manufacturers to reduce leakage from WCs.

Please answer Questions 16, 17 and 18 for this section (see Annex B)

6. Next steps

Any comments received from this public consultation and planned notifications to the World Trade Organisation and European Union ¹ will be considered and, where appropriate, relevant changes made to our proposals. These will be outlined in a Government response before the final Regulator Specifications and test code sheets are approved and published on GOV.UK. Test code sheets are currently held on the Water Regs UK website.

We anticipate an implementation period, of not less than 6 months, will be made to enable transition to the new requirements.

The information from the call for evidence, in section 5, will be used to help formulate the steps needed to improve performance and durability of toilet valves. This may need to be considered over a longer term and will not delay implementation of the proposed changes suggested in section 3.

Please answer Questions 16, 17 and 18 for this section (see Annex B)

¹ Defra will be notifying the World Trade Organisation (WTO) of our proposed changes detailed in section 3 as a potential technical barrier to trade. Under the Northern Ireland Protocol, notification is also required to the European Union (EU) (under the Technical Standards Directive 2015/1535/EC) because these changes are relevant to compliance in Northern Ireland.