



Test Code Sheet 2213.20 – Dimensional and internal overflow compatibility

Issue No. 1

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Pages: 1-9

1. PURPOSE

Type AUK4 air gap arrangement verification as described in the Specification for the Prevention of Backflow.

2. TYPE OF TEST(S)

Dimensional and internal overflow compatibility

3. REGULATION REQUIREMENTS FOR FITTINGS

Schedule 2

15 (1) ...every water system shall contain an adequate device or devices for preventing backflow of fluid from any appliance, fitting or process from occurring.

4. GENERAL TOLERANCES AND MEASUREMENTS

In the absence of specific tolerances or accuracies the following shall apply.

1. Dimension: up to and including 75 mm $\pm 5\%$; over 75 mm $\pm 2\%$.
2. Flow rate and pressure: $\pm 5\%$ of the value specified.
3. Temperature: cold water $\pm 10\text{ }^{\circ}\text{C}$ of the value specified.
4. Linear measuring instruments shall have a minimum resolution of 0.5 mm.
5. Timing instruments shall have a minimum resolution of 0.1 seconds.
6. All the measuring instruments shall have an error limit of $\pm 2\%$ of the measured value.

5. TEST PROCEDURE

5.1 Tests applicable to the following-

TYPE AUK4 AIR GAP DEVICE WITH INTERPOSED FLUSHING CISTERN

Devices for the prevention of contamination by backflow. This arrangement may only be used with a flushing cistern and appropriate receiving vessel.

(A) TYPE AUK4 - AIR GAP DEVICE WITH INTERPOSED FLUSHING CISTERN

TEST METHOD

A1 Scope

Procedure A specifies the characteristics of Type AUK4 air gaps. Air gaps that comply with the requirements of this procedure are devices for protection of wholesome water installations from contamination within a flushing cistern for example as part of a WC suite or urinal.

This is the performance criteria for Type AUK4 air gaps. Materials of construction must be fit for the purpose and application to ensure compliance with this procedure during normal working use.

A2 Definitions

Definitions as referenced in the Water Supply (Water Fittings) Regulations 1999 and Specification on the Prevention of Backflow.

i. Type AUK4 air gap with interposed flushing cistern

Type AUK4 air gap with interposed flushing cistern is a non-mechanical backflow prevention arrangement consisting of a flushing cistern feeding by gravity a receiving vessel (e.g. WC pan). The interposed flushing cistern incorporates a Type AG or Type AC air gap and an overflow. The spill-over level of the receiving vessel (e.g. WC pan) being located not less than 150 millimetres below the overflow pipe (or combined warning/overflow pipe), and not less than 15 millimetres below the internal spillover level with all devices (e.g. flushing valve and associated attachments) completely removed (see Figure 2).

ii. Flushing cistern

Means a cistern provided with valve or device for controlling the discharge of the stored water into a water closet pan or urinal.

iii. Flushing device

Device fitted to a flushing cistern to provide controlled measured volume(s) of water to a receiving vessel for flushing.

NOTE 1: A flushing device can be a siphon, drop valve, flap valve or pressurised cistern etc. The flushing device includes the activator (i.e. handle, button, linkages, etc.) and all seals, pistons, or other integral components.

iv. Spillover level

Means the level at which the fluid in a receptacle will first spill over the top edge of a receptacle if the inflow of water exceeds the outflow through any outlet and any overflow pipe.

v. Graphic symbol



A3 Designation

The air gap is designated by:

- its Type
- the DN of the feed pipe to the assembly

A4 Materials

The manufacturer shall state the type of materials chosen in his technical and commercial documents.

The surface condition of materials in contact with water shall be chosen to be the least inclined to scale.

The materials used upstream, and including the atmospheric outlet opening (e.g. for Type AC air gap the air port inlet), must comply with BS 6920 or other national standard which provides an equivalent level of protection or performance.

The choice of other material is discretionary but shall be suitable for the intended use of the appliance (temperature, corrosion, scale, etc).

There are no special requirements concerning the materials used downstream of the atmospheric outlet opening provided they do not have any harmful effect on the upstream part.

A5 Design

i. General

The protection assembly comprises of the following parts:

- a) A single water inlet device.
- b) Flushing device.
- c) An overflow/warning pipe.
- d) Flushing cistern.
- e) Receiving vessel.

ii. Water inlet device

Every float-operated valve or other device which controls the inflow of water to a flushing cistern shall be securely and rigidly fixed to that cistern.

Every feed pipe supplying water to such a valve or other device shall be fixed in its position to prevent it from moving or buckling.

Submerged supply pipes or inlet devices within the flushing cistern shall not have a mechanical joint (see Note 2) at or below the critical water level (h).

NOTE 2: Mechanical joints are joints which when undone open a direct pathway between the wholesome water (incoming supply) and the water stored within the flushing cistern. These include joints that:

- a) are 'adjustable' or can be 'dismantled'; or
- b) rely on elastomeric, or other material, to provide a water-tight seal; or
- c) where the coupling of two components being dependent upon mechanically applied forces, with or without the use of secondary seal.

Joints not considered mechanical joints include:

- a) Nuts or jointing mechanism on the diaphragm housing assembly.
- b) Joints where the joining surface are permanently fused together, for example by a chemical process or the application of heat.

iii. Air gap

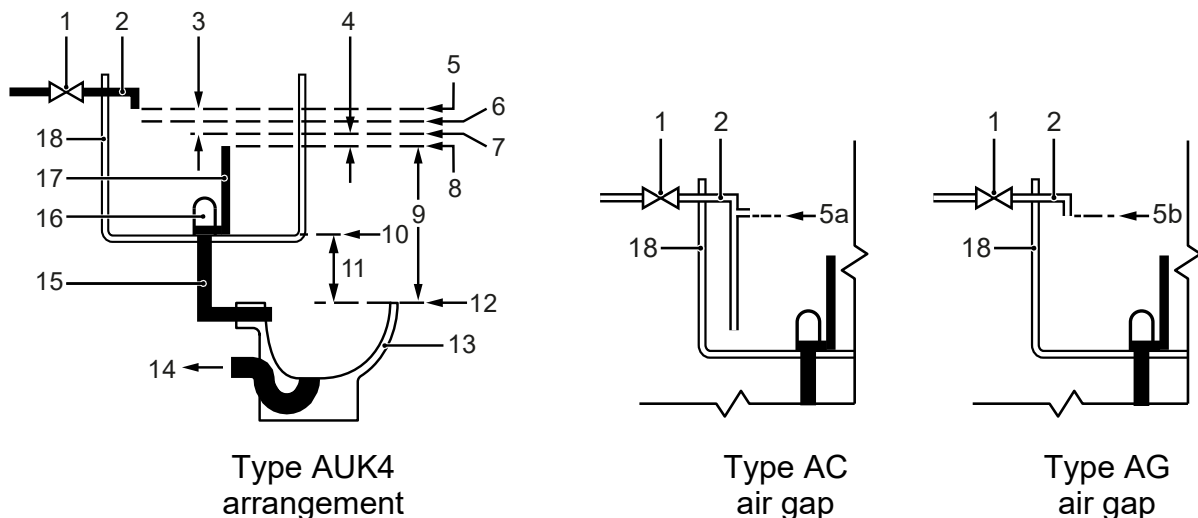
The air gap shall conform to either a Type AC air gap (Test Code Sheet 2213.15) or a Type AG air gap (Test Code Sheet 2212.3).

iv. Warning pipe and overflow arrangements

- The overflow shall be capable of draining off the maximum inlet flow.
- Shall not be less than 19mm internal diameter.
- Overflow arrangements must include an air break prior to a connection to drain. An air break to drain must conform to Test Code Sheet 2212.10 or BS EN 1717.

NOTE 3: Clauses A5 iv b) and A5 iv c) do not apply to a WC suite, or urinal, where the overflow discharges internal to the bowl providing the overflow is not less than 19 mm internal diameter at the point water enters the overflow to be discharged; and the critical water level (h) has been verified by test.

Figure 1 Type AUK4 air gap with interposed flushing cistern



Key for Figure 1

- | | | |
|---|--|--|
| 1 service valve | b) Type AG air gap, lowest point of discharge | 12 receiving vessel spillover level |
| 2 inlet device | 6 maximum water level | 13 receiving vessel (e.g. WC pan) |
| 3 air gap (type AC or AG) | 7 critical water level (h) | 14 receiving vessel outlet |
| 4 dimension (h) above the spillover level | 8 overflow invert level | 15 discharge pipe from interposed flushing cistern |
| 5 inlet device air gap reference point: | 9 ≥ 150 mm | 16 flushing device |
| a) Type AC air gap, lowest point of air inlet orifice | 10 internal spillover level with flushing devices etc. removed | 17 overflow |
| | 11 ≥ 15 mm | 18 interposed flushing cistern |

A6 APPARATUS

The following apparatus is required:

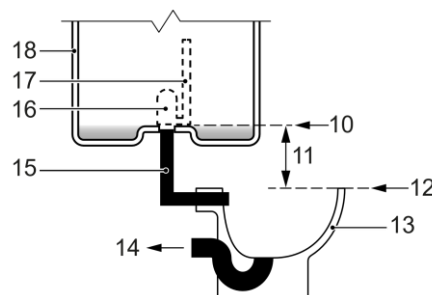
- Measuring equipment with an accuracy of 0.5 mm.

A7 PROCEDURE

The procedure shall be as follows:

- a) WC pan with associated flushing cistern and/or flushing device, or a close coupled/one-piece suite, all meeting the appropriate requirements of this specification, installed in accordance with the manufacturer's instructions on a firm, flat horizontal/vertical surface as appropriate.
- b) Ensure that the interposed flushing cistern complies with the requirements of Type AC air gap (Test Code Sheet 2213.15) or Type AG air gap (Test Code Sheet 2212.3).
- c) With the flushing device completely removed use sufficient water to establish the residual fluid level within the flushing cistern.
- d) Allow sufficient time for the fluid level to stabilise. Measure the dimension between the spillover level of the receiving vessel (e.g. WC pan) and the lowest internal residual fluid level of the interposed flushing cistern.
- e) Measure the dimension between the spillover level of the receiving vessel (e.g. WC pan) and the invert level of the overflow pipe.

Figure 2 Flushing cistern showing the internal spillover level



Key for Figure 2

10 internal spillover level with flushing devices etc. removed	13 receiving vessel (e.g. WC pan)	16 flushing device removed
11 ≥ 15 mm	14 receiving vessel outlet	17 overflow removed
12 receiving vessel spillover level	15 discharge pipe from interposed flushing cistern	18 interposed flushing cistern

(B) TYPE AUK4 - COMPONENT COMPATIBILITY (INTERNAL OVERFLOW)

TEST METHOD

B1 Scope

Procedure B specifies additional verification requirements and applies to all WC Suites incorporating Type AUK4 air gaps unless they include one or more of the following:

- An inlet valve achieving a Type AG air gap;
- A diaphragm operated siphon; or
- An overflow which discharges external to the WC suite (i.e. overflowing water does not return to the flush pipe or WC pan).

When tested as described in B4 no fluids (discounting droplets) rise within the overflow pipe to a level less than or equal to 20 mm, measured vertically down from the overflow invert level.

B2 Pre-testing

The following tests shall be successfully completed prior to undertaking the test.

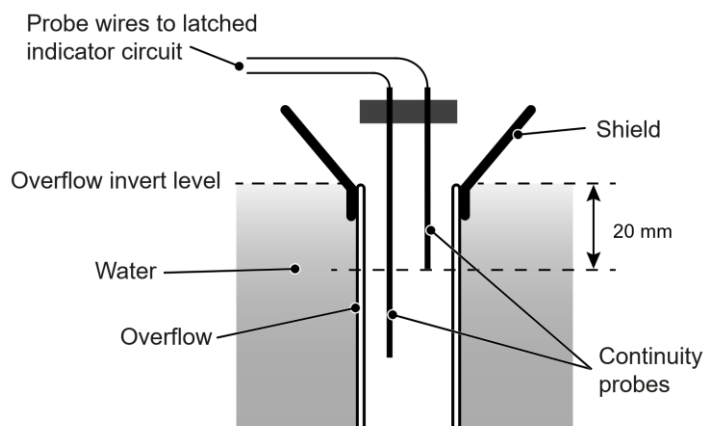
- a) verification of warning and overflow provision (Test Code Sheet 5011.7).
- b) verification of flushing volume (Test Code Sheet 3212.1).
- c) verification of the flush rate (Test Code Sheet 1511.2).
- d) verification of an air gap (e.g. Type AC air gap - Test Code Sheet 2213.15).
- e) verification of the Type AUK4 backflow prevention arrangement – Procedure A above.

B3 Apparatus

The following apparatus is required:

- a) Receiving vessel with associated flushing cistern (e.g. close coupled, low level, concealed etc.), or one-piece WC suite, with a flushing device, warning/overflow and inlet valve meeting the appropriate requirements of the Regulator's WC Suite Performance Specifications.
- b) Appropriate device(s) to block the outlet of the receiving vessel (e.g. WC pan) and any external warning provisions (e.g. warning pipe).
- c) Continuity probes with a latched indicator circuit, or a no less effective method.
- d) Measuring instrument.
- e) Water supply controlled by a stop valve as appropriate.

Figure 3 (informative) diagram showing continuity probe method



B4 Procedure

The procedure shall be as follows:

- a) Assemble all components of the assembly (e.g. WC suite) including fittings following the manufacturers' installation instructions, on a firm, flat horizontal/vertical surface as appropriate.
- b) Block all outlets of the receiving vessel (e.g. WC trap) and any external warning provision (e.g. warning pipe).
- c) Fill the receiving vessel with water to the spillover level of the receiving vessel.
- d) Fill the flushing cistern to the invert level of the overflow. If the inlet valve is connected to a water supply, turn off the water supply unless essential for the normal operation of the flushing device (see Notes 4-6).
- e) Ensure the internal surface of the internal overflow pipe is sufficiently free of moisture which would otherwise cause inaccurate measurement of the rising water.
- f) Rapidly operate the flushing mechanism and allow the flushing cistern to drain during the full flush operation (see Note 7).
- g) Observe and record results appropriate for the test method, e.g. visually observed the level the fluid reached; continuity probe method if the fluid exceeds the 20 mm level (see Notes 5).
- h) Repeat test 5 times in total.

NOTE 4: Where a water supply is essential for the normal operation of the flushing device maintain the supply at a hydraulic pressure of 1.5 ± 0.1 bar or the minimum required to operate the device whichever is the greater.

NOTE 5: To prevent the water within the flushing cistern accidentally spilling over the invert into the overflow a shield is permitted to be applied to the external surface of the overflow pipe.

NOTE 6: Where there are multiple water and overflow levels; or combinations of flushing device(s) and or overflow(s) the test shall be completed for each qualifying combination (see B4).

NOTE 7: Operating the flushing mechanism (e.g. the time taken to operate the lever/button and fully activate the full flush) within approximately 1 second is considered 'rapid' and within approximately 3 seconds 'slow'.

B5 Expression of results

Record compliance or any failure to comply, with the requirements.

6. ACCEPTANCE CRITERIA

6.1 Test method (A)

When tested as described in A7:

- a) The assembly must satisfy the appropriate requirements for Type AC air gaps (Test Code Sheet 2213.15) or Type AG air gaps (Test Code Sheet 2212.3); and
- b) With the flushing device completely removed, the measurement between the spillover level of the receiving vessel and the lowest internal residual fluid level of the interposed flushing cistern is equal to or greater than 15 mm. See Figure 1; and
- c) The measurement between the spillover level of the receiving vessel and the invert level of the overflow is equal to or greater than 150 mm.

6.2 Test method (B)

When tested as described in procedure B4 no fluids rise within the overflow pipe to a level less than or equal to 20 mm, measured vertically down from the invert level of the overflow.

7. COMING INTO EFFECT

This test code sheet will come into effect on 6 May 2027, being one year after its publication on gov.uk.