

# AffinityWater

WATER UNDERTAKERS

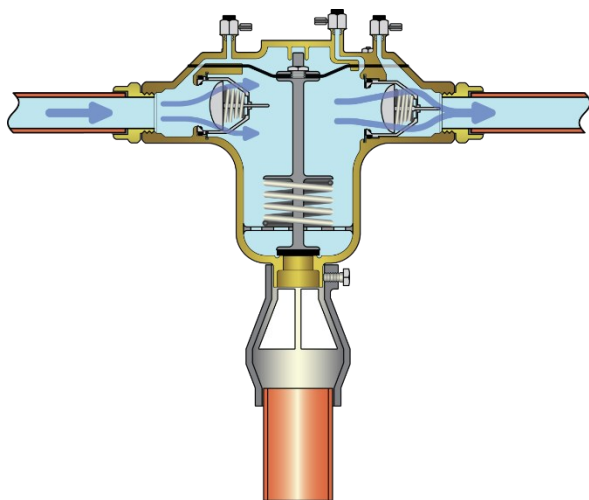
REDUCED PRESSURE ZONE VALUE (RPZ)

APPROVED INSTALLATION METHOD (AIM)

ISSUE 3 : JANUARY 2025



## WATER UNDERTAKERS RPZ AIM



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### INTRODUCTION

The Water Supply (Water Fittings) Regulations/byelaws in [England, Wales](#) and [Northern Ireland, byelaws in Scotland](#) are legal requirements which apply to all premises which have, or will have, a mains water supply.

An important item of public health legislation, their purpose is to safeguard drinking water supplies both on site and in the wider drinking water supply network. They do this by setting legal requirements for water fittings as well as the design, installation, operation and maintenance of plumbing systems. All water fittings supplied with water by a water undertaker, including RPZ valves (also referred to as Type BA devices), must comply with the requirements of the regulations; failure to do so could result in prosecution.

RPZ valves are backflow prevention devices which can be used to provide protection against backflow of a fluid not exceeding fluid category 4. To comply with the regulations/byelaws they must be installed in a workmanlike manner and periodically tested to demonstrate they are providing backflow protection and not wasting water. Those responsible for RPZ valves must be aware consent to install will always be conditional, one condition being the requirement for the RPZ valve to be tested by a competent RPZ tester at regular intervals set by the local water undertaker. Please note test intervals will not exceed 12 months but in some circumstances may be less.

This Approved Installation Method (AIM) sets out requirements for the installation, commissioning, and periodic testing of RPZ valves approved by the water undertakers listed below. To conform with this AIM all applicable clauses must be satisfied. Non-conformity would be a relevant consideration in determining whether a criminal offence has been committed.

Affinity Water	Icosa Water Limited	South Staffs Water
Albion Water	Independent Water Networks Ltd	South West Water
Albion Eco	Leep Utilities	Thames Water
Anglian Water	Northern Ireland Water	United Utilities
Bristol Water	Northumbrian Water	Wessex Water Services
Bournemouth Water	Portsmouth Water	Yorkshire Water Services
Cambridge Water	Scottish Water	
Dwr Cymru (Welsh Water)	SES Water	
ESP Utilities Group	Severn Trent Water	
Essex and Suffolk Water	Southern Water	
Hafren Dyfrdwy	South East Water	

For further information about the regulations/byelaws please refer to your local water undertaker's website and Water Regs UK [www.waterregsuk.co.uk](http://www.waterregsuk.co.uk)

## 1. NOTIFICATION

The regulations/byelaws include the requirement to notify the local water undertaker of proposed plumbing work.

Failure to notify the installation, relocation, extension, alteration, change of use or disconnection of plumbing that incorporates a RPZ valve could result in legal action being taken.

Notifications should be submitted no less than 10 working days before work is due to start using the local water undertakers notification form which can be found on their websites or [Water fittings regulations - Apply - Affinity Water](#)

The minimum information required is:

- the name and address of the person giving the notice, and (if different) the name and address of the person to whom consent should be sent;
- a full description of the proposed work;
- the location of the premises;
- a plan of those parts of the premises to which the proposal relates, and a diagram showing the pipework and fitting to be installed; and
- where the work is to be carried out by an approved contractor, the name of the contractor.

Failure to provide the minimum level of information required may delay consent.

### Consent

Water undertakers may withhold or grant consent. Consent for the installation of a RPZ valve will always be subject to conditions.

- Periodic compliance testing as well as testing following installation, repair and relocation will be a condition of consent.
- Periodic compliance testing intervals will be set by the local water undertaker and cannot be changed without their consent.
- Consent will only be granted if the RPZ valve is of an appropriate quality and standard as well as being suitable for the circumstances in which it will be used.

For example, where an RPZ valve installation is subject to pressure variations, should these fluctuations exceed the manufacturer's tolerances the relief valves may be prone to discharge. As this would be a waste of water the RPZ valve may be considered unsuitable unless action is taken to prevent the unwanted discharge.

- Consent will not be granted for the installation of RPZ valves in a location or position which:
  - is liable to flooding;
  - is above, or where, electrical equipment is located;
  - is liable to mechanical or other damage;
  - is exposed to freezing, unless measures are taken to prevent the assembly from freezing;
  - is concealed;
  - is below ground;
  - creates a hazard or restricts access to the valve for operation/maintenance/repair/ commissioning or compliance testing;
  - prevents identification of the unique serial number identifier.

Installation in a basement or plant room below ground may be accepted subject to the agreement of the water undertaker.

RPZ valves shall not be installed until consent is deemed to have been granted.

Failure to comply with the requirements specified as a condition of consent may result in the water undertaker taking enforcement action which may include legal action, temporarily disconnecting the water supply to the premises and requiring the removal of the

RPZ valve and installation of alternative backflow protection. In the case of disconnection, reconnection shall only be with the agreement of the water undertaker.

For further information please refer to the Water Regs UK website [www.waterregsuk.co.uk](http://www.waterregsuk.co.uk)

## 2. INSTALLATION

An RPZ valve shall be installed above floor level at a height that enables effective inspection, maintenance, commissioning and compliance testing (see Figure 1).

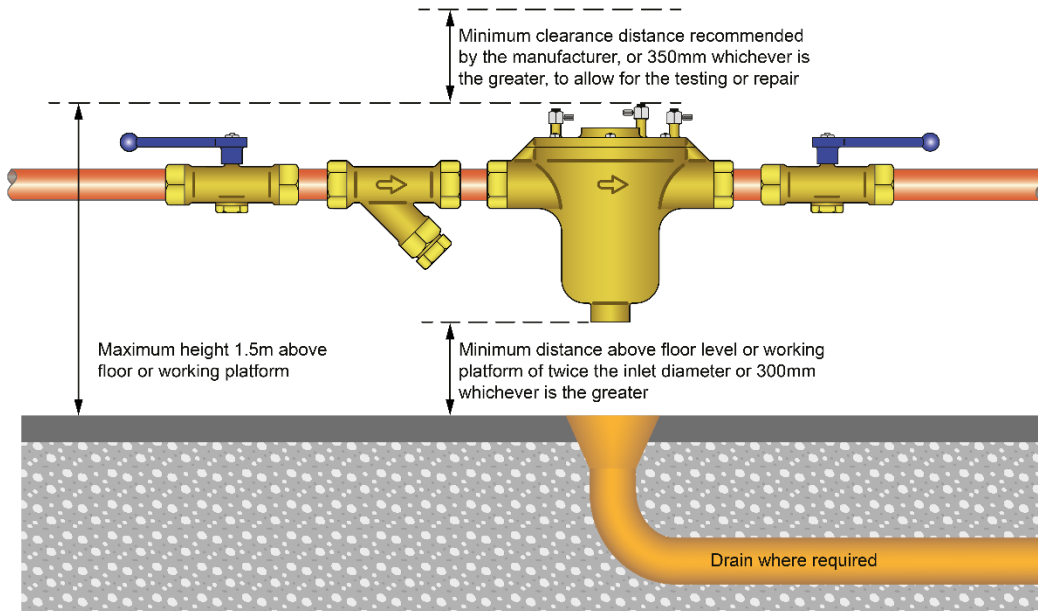


Figure 1: side view of minimum clearances

The minimum distance from the underside of the exit port of the relief valve to the ground, floor level or the base of any cabinet shall be twice the inlet diameter or 300 mm whichever is the greater. Unless otherwise agreed by the water undertaker, the maximum height from the ground or floor level, including permanently fixed gantries, shall be no more than 1.5 m to the top of the valve. The use of permanently available or mobile platforms to access RPZ valves for testing etc. is subject to the consent of the water undertakers.

Except for the closure of secure cabinet doors and lids, there shall be free access for both the maintenance of the assembly and the use of test equipment. The recommended minimum clearances are detailed in Figure 2.

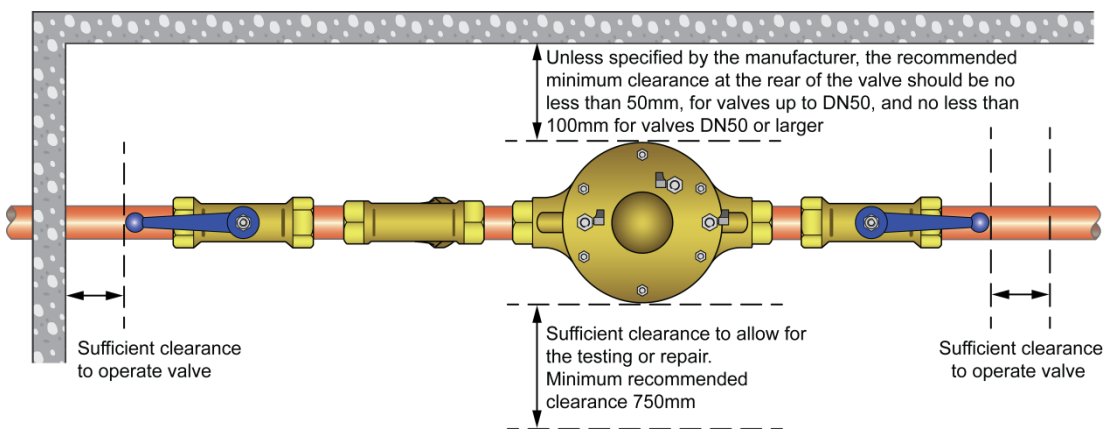


Figure 2: plan view of minimum clearances

Any discharge originating from a RPZ relief valve must be readily visible. The relief valve can discharge directly onto the floor or to drain. However, there must be an appropriate air gap between the relief valve discharge point and any arrangement used to channel it to waste. That is to say an air break to drain installed in accordance with the requirements of the current version of BS EN 1717, or a Type AA or AB air gap. If installed in a cabinet provision shall be made to allow any discharge from the relief valve to drain freely.

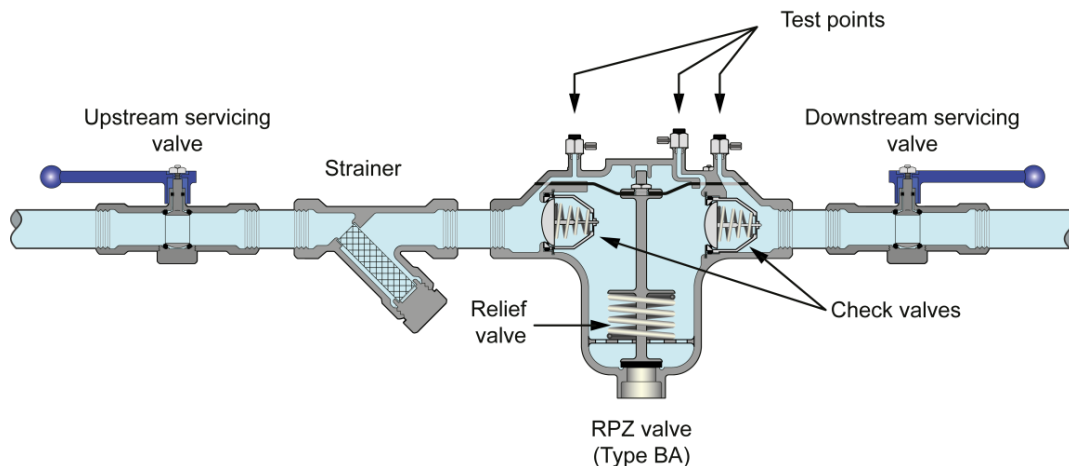


Figure 3: illustration showing all the components in a RPZ valve assembly

Except for RPZ valves designed and of an appropriate quality and standard for vertical or inclined installation, RPZ valves shall be installed horizontally with the relief valve discharging downwards.

Servicing valves shall be installed immediately upstream and downstream of the RPZ valve assembly. The servicing valve on the inlet should be upstream of any inlet strainer installed (see figure 3).

Unless already incorporated as part of the valve or agreed otherwise with the local water undertaker, an inline strainer should be installed immediately upstream of a RPZ valve.

It is recommended that a test record card (see figure 4) be attached to or left adjacent to the RPZ valve. An example is given below.

<p><b>RPZ Valve serial number:</b>  <b>Date first commissioned:</b>  <b>Test due date:</b>  <b>Test interval:</b>  <b>Date tested:</b>  <b>Results of test:</b>  <b>Reason for test:</b>  <b>Name of RPZ tester:</b>  <b>RPZ tester's scheme name</b>  <b>RPZ tester's scheme membership number:</b>  <b>Signature:</b>  <b>Re-test date:</b></p>
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Figure 4: test record card

### 3. TESTING

The testing specified in this AIM are the minimum requirements for demonstrating that a RPZ valve is operating as intended. Testing shall be carried out by a competent RPZ tester using suitable, calibrated pressure test equipment.

## Equipment

Testing shall only be undertaken using suitable calibrated pressure test equipment appropriate for the installation being tested. For example, suitable for hot water testing where the RPZ valve is installed as part of a system conveying water at elevated temperatures.

RPZ test kits must be calibrated by a calibration service accredited by UKAS at least annually, or where specified by the equipment manufacturer more frequently. Please refer to the [RPZ test equipment information](#) for further details.

RPZ testers are responsible for:

- Confirming with the calibration service used any corrections to be applied when using their equipment.
- Applying these adjustments to the test result recorded in the test reports they issue.

For a test report to be accepted the instrumentation used to test RPZ valves must be\*:

- A differential pressure gauge
- Capable of measuring the pressure differentials required to satisfy the acceptance criteria specified in this AIM i.e. in the range 0.5 kPa (0.005 bar) - 34 kPa (0.34 bar) please refer to the [RPZ test equipment information](#) for further details.
- Capable of completing all aspects of the periodic compliance test.
- Marked with unique identifier(s) such as a serial number
- Capable of being calibrated.

**\*PLEASE NOTE: it is anticipated all RPZ test equipment will meet this minimum requirement no later than 1<sup>st</sup> July 2026.**

**Until 1<sup>st</sup> January 2026** if a u-tube manometer is used to test the differentials between zones the test procedures identified in clause 9.5.2 BS EN 12729 (2023) and Regulators Specification test code sheet 1111.13 should be used. **The use of a single tube manometer to measure a head of pressure is not an acceptable test method for determining pressure differentials.**

## RPZ Tester Competency

For a test report to be accepted as valid on-site testing of a RPZ valve shall only be carried out by someone who is competent. For the purposes of this AIM that is someone:

- With a current recognised qualification in RPZ valve commissioning and compliance testing issued by a RPZ training provider recognised by the local water undertaker. To be considered as current qualifications shall be revalidated at least every 5 years\*.
- Who is either a member of a scheme for RPZ testers recognised by the local water undertaker, for example a member of a water undertaker approved contractor scheme or WaterSafe [www.watersafe.org.uk](http://www.watersafe.org.uk), or recognised by the local water undertaker on a site specific basis.

**\*PLEASE NOTE: it is anticipated those who revalidated their City & Guilds qualification by completing the RPZ tester conversion training prior to December 2020 should revalidate no later than 31<sup>st</sup> December 2026. Those who qualified since November 2021 should do so no later than 5 years after the date of their certification.**

## New RPZ installations

Before it can be brought into service all newly installed RPZ valves, including replacement RPZ valves, must satisfy the requirements of both on-site commissioning and compliance testing, plus where required flushing and disinfection.

The commissioning procedure is required to ensure the assembly is brought into service in a controlled manner and to confirm key components are functioning.

Specifically:

- Both the upstream and downstream servicing valves shut off the water supply.
- The RPZ valve assembly is free of air.
- The relief valve will open when the upstream pressure is relieved and close watertight once the upstream pressure has been restored.
- Both check valves will close tight when there is no flow of water.

## Commissioning procedure

Failure to satisfy any clause of the commissioning procedure shall be recorded as a test failure.

1. Confirm consent for the installation of the RPZ valve has been granted and all conditions of consent, excluding those relating to compliance testing, have been complied with.
2. Confirm the RPZ valve assembly complies with the requirements of regulation 4(1).
3. **Visual inspection**
  - 3.1 Confirm the RPZ assembly installation conforms to the installation requirements set out in section 2, is leak free and watertight.
  - 3.2 Confirm the satisfactory functioning of the strainer (debris to be removed if present).
4. **Component testing**
  - 4.1 The RPZ valve must complete 4 consecutive cycles of clauses 4.4 – 4.6. Failure to satisfy at any stage shall be recorded as a failure.
  - 4.2 Testing shall be carried out under normal operating conditions for the installation.
  - 4.3 The downstream servicing valve shall remain closed for the duration of the test.

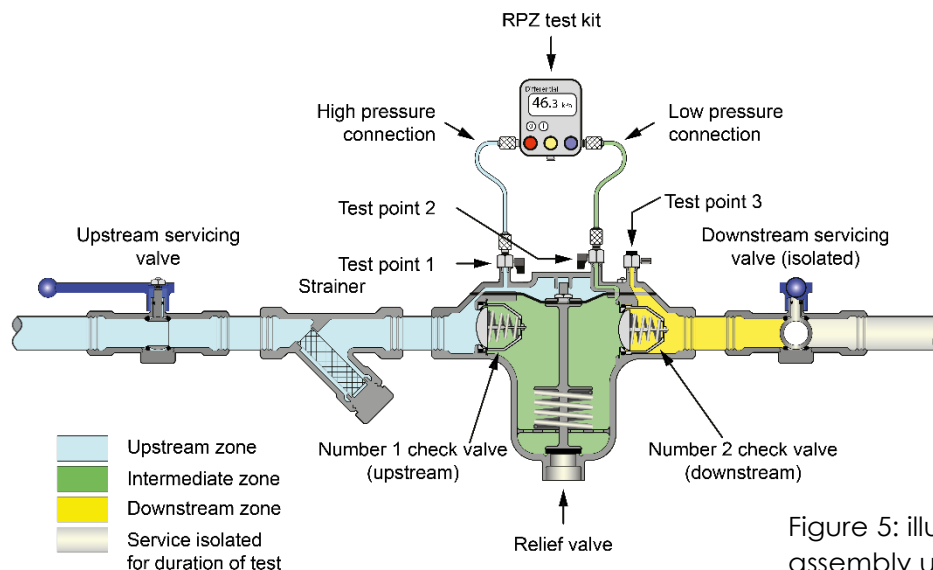


Figure 5: illustration of a RPZ assembly undergoing

- 4.4 Fill the assembly with water from the upstream supply, purging air through the test points until no further air discharges. Once filled and air free, close all test points, after 2 minutes inspect the assembly.

**Acceptance criteria:**

- i. verify by visual inspection the RPZ assembly is free from air and watertight.

- 4.5 Isolate the upstream water supply by closing the upstream servicing valve. Release the pressure from the upstream zone by opening test point 1. Observe the operation of the relief valve discharge system.

**Acceptance criteria:**

- i. verify by visual inspection that water is evacuated from the intermediate zone via the relief valve when the upstream pressure is relieved.

- 4.6 Ensure test point 3 (downstream zone) is dry. Open and observe test point 3 (downstream zone).

**Acceptance criteria:**

- i. verify by visual inspection that water is discharged from or is visible in test point 3 (downstream zone) following its opening.

5. If the RPZ valve satisfies all requirements, refill the assembly ensuring that no leaks are visible. The RPZ valve must be isolated and not be put into service until a compliance test has been satisfactorily completed by closing both servicing valves.

### **Existing RPZ valve installations**

All RPZ valves require periodic compliance testing as a condition of consent. This is an on-site safety check to confirm the key components continue to provide the required level of backflow protection and are not wasting water. Specifically:

- Both check valves are watertight at low pressure.
- There is an adequate pressure differential between the intermediate zone and both the upstream and downstream zones.
- The relief valve is operating correctly.

For RPZ valves already in service testing must be completed by the test due date set by the local water undertaker.

### **Compliance testing procedure**

Failure to satisfy any clause of the compliance procedure shall be recorded as a test failure.

1. Confirm the RPZ valve has satisfactorily completed the commissioning procedure.

2. **Visual inspection**

- 2.1 Confirm the RPZ assembly conforms to the installation requirements set out in section 2, is leak free and watertight.

- 2.2 Confirm the satisfactory functioning of the strainer (debris to be removed if present).

3. **Component testing**

- 3.1 Testing shall be carried out under normal operating conditions for the installation.

- 3.2 The downstream servicing valve shall remain closed for the duration of the test.

- 3.3 Connect the RPZ test kit to the test points in the zones immediately upstream and downstream of the check valve being tested.

- 3.4 Ensure that any air is purged from the test equipment. Inspect the RPZ assembly and test equipment.

**Acceptance criteria:**

- i. there must be no visible leaks.



3.5 Induce a flow across the check valves. After 15 seconds [ $^{+10\%}_{-0}$ ] isolate the flow and allow the pressure to stabilize before measuring pressure differentials and relief valve point of operation (pd2).

**Acceptance criteria: check valves**

- i. Upstream & intermediate zones (pd1). The number 1 check valve must maintain a pressure differential greater than 34 kPa (0.34 bar) between the upstream and intermediate zones.
- ii. Intermediate & downstream zones. The number 2 check valve must maintain a pressure differential between the intermediate and downstream zones greater than 7 kPa (0.07 bar) unless the check valve conforms to the current version of the British Standard for check valves, in which case the minimum pressure differential must be 0.5 kPa (0.005 bar).

3.6 Calculate the pressure fluctuation accommodated (buffer)

$$pd1 - pd2 = \text{pressure fluctuation accommodated}$$

where:

pd1 = the pressure differential between upstream & intermediate zones

pd2 = the pressure differential at which the relief valve discharges

**Acceptance criteria: relief valve**

- i. Unless otherwise agreed with the local water undertakers the relief valve must not discharge when the upstream pressure fluctuates by  $\pm 10$  kPa ( $\pm 0.1$  bar) i.e. a range of 20 kPa (0.2bar).
- ii. The relief valve must remain watertight when not in operation.
- iii. When reducing the pressure differential between the upstream & intermediate zones, the relief valve must begin to discharge at a pressure differential (pd2) greater than 14 kPa (0.14 bar) between the two zones.

**Repaired, replaced or relocated RPZ valves**

Both onsite commissioning and compliance testing is required by the water undertaker for any existing RPZ valve which has:-

- Been dismantled in anyway (e.g. following maintenance of an integral strainer)
- Been replaced or had components replaced
- Has been relocated (this includes RPZ valves that form part of equipment which is portable or routinely moved, either within or between premises and reconnected e.g. a cement batching plant or attached to a standpipe).

Only when these RPZ valves satisfy these tests requirements can they be brought back into service.

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## 4. CERTIFICATION

All RPZ valves must be certified by a competent RPZ tester.

- A commission test report certified by the tester must be received by the local water undertaker within 10 working days of installation and following repair, dismantling and relocation.
- Unless reporting a failure, a compliance test report must be received by the local water undertaker within 10 working days of a set test interval or following repair, dismantling and relocation.

Periodic on-site compliance testing shall be carried out at least annually or at more frequent intervals as specified by the water undertaker. The date by which the next test must be completed, the test due date cannot be changed without the agreement of the local water undertaker.

Compliance testing must be carried out no later than the test due date. For RPZ valves requiring annual testing, a compliance test shall be carried out no earlier than 30 days prior to the test due date. Early testing of other RPZ valves may be undertaken with the agreement of the water undertaker.

For a test certificate to be accepted by the local water undertaker it has to be provided in a format which is acceptable, this is particularly important when submitting electronically.

Upon completion of commissioning and/or compliance test the RPZ tester shall provide a signed test report to the person responsible for the RPZ valve.

As the local water undertaker may require copies of test reports and any maintenance records associated with an RPZ valve, it is recommended that customers retain commissioning test reports for the lifetime of a valve and all compliance test reports, irrespective of the results, for a period of at least five years.

#### **Minimum information**

Failure to provide the minimum information required could invalidate a test report.

Minimum information:

- information about the RPZ tester, including:-
  - their name
  - their contact details including direct telephone number, email address and business address
  - their signature (water undertakers may accept electronic signatures but it must be the signature of the person who tested the valve.)
  - where applicable the tester's scheme name and membership number. Please note if not a scheme members copies of RPZ testing qualifications, insurance and test equipment calibration certificates must be provided.
- information about premises at which the RPZ valve is located, including:-
  - the address
  - phone number
  - name and email address of the person responsible for the RPZ and if different the name and email address of the contact on site.
- information about the installation including:-
  - details of where the RPZ valve is located on site
  - a description of the water system which the RPZ valve forms part of including details of the type of equipment downstream of the RPZ valve.
  - confirmation that consent to install has been granted
  - confirmation that RPZ valve is installed in accordance with the conditions of consent
  - date of installation/commissioning
  - date of last test
- details relating to the RPZ valve including:-
  - the name of the manufacturer
  - the model
  - the size
  - the serial number
- details relating to the testing including:-
  - test due date
  - date of test
  - test results, including in the case of a test failure details of any observations made and action taken.
  - reason for test
- information about the test equipment used including:-
  - the make of test kit
  - test kit serial number
  - date of calibration
  - confirmation of its suitability for system being tested (e.g. hot water)

### Commissioning test certification

For a commissioning test report to be considered as valid it must:

- Be certified by a competent RPZ tester.
- Provide the minimum required level of information.
- Be signed and dated by the RPZ tester who completed the testing (water undertakers may accept electronic signatures).
- Be received by the water undertaker within 10 working days of commissioning of the RPZ valve unless reporting a test failure.

### Compliance test certification

For a compliance test report to be considered as valid it must:

- Be certified by a competent RPZ tester using suitably calibrated pressure test equipment appropriate for the installation being tested.
  - Provide the minimum required level of information.
  - Be signed and dated by the RPZ tester who completed the testing (water undertakers may accept electronic signatures).
  - Satisfy all conditions of consent relating to compliance testing.
  - Be received by the water undertaker within 10 working days of the compliance test being completed unless reporting a test failure.
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## 5. REPORTING

In addition to providing the customer with a copy of the signed test report the RPZ tester shall retain a copy, and send a copy to the water undertaker within 10 working days of completion of the test, unless reporting a failure. Failure to satisfy this reporting requirement shall invalidate a test report.

### Test Failures

Failure to satisfy any of the requirements of either the commissioning procedure or compliance testing shall be recorded and reported to the local water undertaker as a test failure within the timescales set out below.

- In the event of a commissioning test failure, the nature of the failure shall be recorded in the test report and notified to the water undertaker **within 24 hours**. The RPZ valve must remain isolated until any actions required by the water undertaker have been carried out.
- If a RPZ valve fails the compliance test but is repaired and satisfactorily retested immediately then it may be returned to service. The test failure and successful retest, together with details of the repairs undertaken and any suspected contributing factors to the failure, shall be reported to the water undertaker **within 24 hours**.
- In the event of a compliance test failure where an RPZ valve cannot be repaired and satisfactorily retested immediately, the tester shall notify the water undertaker **immediately of the nature of the failure in order for the water undertaker to confirm what action is to be taken**.
- Actions required by the water undertaker shall be notified to the person responsible for the RPZ valve by the tester.

## GLOSSARY

**Air Gap** means a visible, unobstructed and complete physical air break between the lowest level of water discharge and the level of potentially contaminated fluid downstream (critical water level) within a cistern, vessel, fitting or appliance that:-

- a. is not less than 20 mm or twice the internal diameter of the inlet pipe whichever is the greater; and
- b. from which water discharges at not more than 15° from the vertical centreline of the water stream.

**Approved contractor** means a person who, for the purpose of the regulations has been: -

- a. approved by the water undertaker for the area where a water fitting is installed or used; or
- b. certified as an approved contractor by an organisation specified in writing by the regulator.

**Approved contractor schemes** a list of current schemes is available from the WaterSafe website [www.watersafe.org.uk](http://www.watersafe.org.uk)

**Assembly** an arrangement of components or fittings forming a Type BA backflow prevention device which complies with the relevant requirements of this Approved Installation Method.

**Backflow** means flow that is in a direction contrary to the intended, normal direction of flow, within or from a water fitting.

**Buffer** the difference between the differential pressure across the number 1 check valve and the differential pressure at the moment when the relief valve begins to discharge water.

**Calibration** a test to determine the accuracy of instrumentation. RPZ test kits shall be calibrated by a pressure calibration service accredited by UKAS at least annually or in accordance with the manufacturer's instructions if required more frequently.

**Check valve** a valve which allows fluids to flow through in one direction only.

**Commissioning procedure** a procedure to confirm that a newly installed or repaired RPZ valve is installed and functioning correctly.

**Compliance testing** an on-site procedure to demonstrate that a RPZ valve is installed correctly and all key components are functioning as intended.

**Competent person (tester)** a person recognised by a water undertaker as having sufficient knowledge, experience and skills to enable them to carry out the task of commissioning and/or compliance testing a RPZ valve properly. That is to say in a way which a person competent in this activity would expect it to be done. A competent person will also be able to recognise hazards and have an appreciation of their own limitations. To be a recognised tester a person shall have gained or revalidated a qualification in RPZ valve commissioning and/or compliance testing from a training provider recognised by water undertakers within the last 5 years. They shall also be a member of a scheme for RPZ testers recognised by the water industry (e.g. water undertaker approved contractor scheme or WaterSafe) unless recognised by the relevant water undertaker on a site specific basis.

**Concealed water fitting** means a water fitting which –

- a) is installed below ground;
- b) passes through or under any wall, footing or foundation;
- c) is enclosed in any chase or duct; or
- d) is in any other position which is inaccessible or renders access difficult.

**Consent** the water undertaker's statutory approval for the proposed installation of water fittings, in accordance with regulation 5 of the Water Supply (Water Fittings) Regulations/Byelaws. Consent is deemed to have been granted unconditionally where no notice is given by the water undertaker under Regulation 5(5).

**Fluid category 4** as defined in Schedule 1 of the Water Supply (Water Fittings) Regulations/Byelaws, a fluid which represents a significant health hazard because of the concentration of toxic substances, including any fluid which contains:

- a) Chemical, carcinogenic substances or pesticides (including insecticides and herbicides)
- b) Environmental organisms of potential health significance

**Pressure differential** the difference in pressure between two points of a system.

**Responsible person** the person legally responsible for compliance with the water fittings regulations/byelaws on a site. They may be represented on site by a named contact.

**Strainer** a device used to separate solids from liquid.

**Servicing valve** also referred to as an isolation valve this isolates the water supply to a fitting or system.

**Test due date** the date, determined by the water undertaker, by which a new compliance test must be completed in order to satisfy the conditions of consent.

**Type BA device Verifiable backflow preventer with reduced pressure zone also called a RPZ valve** means a verifiable mechanical backflow prevention device consisting of an arrangement of water fittings with three pressure zones with differential obturators and that will operate when potential backflow conditions occur or there is a malfunction of the valve.

**UKAS the national accreditation body for the UK** [www.ukas.com](http://www.ukas.com)

**WaterSafe** is a free website which lists members of approved contractor schemes, including RPZ testers, which can be searched by name or area.

**Water undertaker** is a public water supply company with the duty to enforce the regulations/byelaws in their area of water supply.