

Type BA – Verifiable Backflow Preventer with Reduced Pressure Zone (RPZ Valve)

Requirements for Installation, On-site Testing and Maintenance

1. Foreword

- 1.1 This Information and Guidance Note sets out the Water Supply Industry requirements for the installation, on-site testing and maintenance of Verifiable Backflow Preventers with Reduced Pressure Zone – hereafter referred to as a Type BA Device. The requirements have been established for the Water Supply Industry to apply, but will also assist installers and others involved directly or indirectly in water supply distribution systems. The document is also intended to be used for educational and administrative purposes and as a technical reference in conducting a backflow prevention and cross-connection control programme.
- 1.2 Backflow arising from connections between potable and non-potable water supplies can constitute a serious public health hazard. There are numerous, well documented cases where backflow from cross-connections has resulted in contamination which could be harmful to health. The problem is a dynamic one because plumbing systems are continually being installed, altered, or extended.
- 1.3 Prevention of backflow requires thorough knowledge and vigilance. Education is essential, even those who are experienced in plumbing systems may fail to recognise potential backflow and cross-connection situations. Those responsible for the water supply in their premises must be familiar with the risks from backflow and cross-connections and must exercise careful surveillance of their systems.
- 1.4 The legal framework controlling/regulating water fittings installations makes it a criminal offence to contaminate the Water Undertaker's supply and to use fittings which are likely to cause contamination. This applies equally to contamination of water in the mains by backflow, as well as in the customer's premises before use.
- 1.5 In support of prevention of the offence specified above, the Water Supply (Water Fittings) Regulations 1999 and the Water Byelaws 2000 (Scotland) provide more detailed requirements in respect of specific fittings. The Regulations (Byelaws) were made under provisions set out in the Water Industry Act 1991 (Water (Scotland) Act 1980). These Regulations (Byelaws) replaced the earlier Water Supply Byelaws and are enforced by the water suppliers.
- 1.6 The particular requirements relevant to risk assessment, backflow protection and backflow protection devices are to be found in Regulations 3 & 4 and Paragraph 15 of Schedule 2.
- 1.7 The Water Industry Act 1991, the Water (Scotland) Act 1980 and other relevant legislation make it clear that any fitting, whether or not it is installed for the purpose of preventing contamination, shall be maintained in working order. Failure to do so may be an offence and non-compliance with this Information and Guidance Note may be a relevant consideration in determining whether an offence has been committed.

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2. General Requirements

- 2.1 For all proposals to install a Type BA device an application must be made to the local Water Supplier. The specimen application form on page 7 is an example of what is required by a Water Supplier before agreeing to allow a Type BA device installation. Approval having been granted, the specific requirements of the Water Supplier and the general requirements set out in this document must be complied with. Approval to install a Type BA device will also include installation, commissioning and on-site testing requirements.
- 2.2 Potential users of Type BA devices must obtain agreement of the Water Supplier that a Type BA device is a suitable means of backflow protection in the plumbing system under consideration (see Section 3). Type BA devices bring about a pressure drop across the device and may not be suitable for use on low pressure supplies. The pressure of the local water supply network must be established with the Water Supplier concerned.
- 2.3 All fittings must satisfy the requirements of the Regulations. Examples of approved fittings can be found in the 'Water Fittings and Materials Directory'. Copies of the Directory are available from the Water Regulations Advisory Scheme (see back page for address).
- 2.4 The installation and use of Type BA devices require a long-term commitment to testing and maintenance on a regular basis. (see Section 5). Test methods and maintenance regimes shall be in accordance with the Water Supplier's requirements; any failure to comply with the requirements may give rise to the Water Supplier terminating the supply or requiring the removal of the Type BA device and the installation of an alternative, suitable backflow prevention arrangement.
- 2.5 In due course, the Water Supply Industry may need to modify its criteria for the installation of Type BA devices in the light of experience gained and also any changes that take place in legislation.

3. Areas of Acceptable Use

3.1 POINT OF USE PROTECTION

- 3.1.1 A Type BA device may be installed to provide protection against backflow at the point of use from a fluid of up to category 4. Fluid Categories are defined in Schedule 1 to the Water Supply (Water Fittings) Regulations 1999 and the Water Byelaws 2000, Scotland.
- 3.1.2 It is acceptable to use a Type BA device to protect against backflow risks from fluids of risk categories less than 4. Where this is proposed, the water supplier should check that the proposer is aware that other devices may be permitted.

3.2 SYSTEM PROTECTION

- 3.2.1 A Type BA device may be installed to provide backflow protection to the whole or part of a water supply system. Where a higher level of protection

against backflow is required (e.g. a Type AA, AB or AD airgap) at a point of draw-off or use, downstream of the assembly, then this shall be provided at the point of draw-off or use, even though a Type BA device is installed for whole site protection.

- 3.2.2 Water drawn off downstream of a Type BA device will not be regarded by a Water Supplier as water supplied for domestic purposes. The responsibility rests with the Water Supplier's customer to ensure the continuing suitability of use of the water downstream of the assembly and to ensure the risk does not exceed fluid category 4.
- 3.2.3 In exceptional circumstances, time-limited approval for installation and use of a Type BA device may be issued where the Water Supplier is prepared to allow a limited period of time for a system to be upgraded.
- 3.2.4 Table 1, 'Protection Matrix', identifies risk areas where assemblies are acceptable. It should be noted that the list is not exhaustive. Advice must always be obtained from the Water Supplier before installation commences on any type of installation or appliance not included in the list.

4. Installation Guidance

applies to new installations and replacement of existing assemblies

- 4.1 Type BA devices shall not be installed in a place or position which is:
- liable to flooding;
 - above electrical equipment;
 - exposed to freezing unless measures are taken to prevent the assembly from freezing.
- The assembly shall be housed in a tamper-free environment or secure cabinet.
- 4.2 There shall be an air gap between the exit port of the relief valve mechanism and the tundish/drain. This air gap dimension will be dependent upon the size of the inlet pipe to the assembly. Adequate drainage from the cabinet shall be installed.
- 4.3 The assembly shall be installed horizontally with the relief valve discharging downwards (unless approved for vertical installation). An in-line strainer shall be installed downstream of the inlet isolating valve and immediately upstream of the Type BA device so as to prevent any fouling of the elements of the assembly¹. Large assemblies should be fitted with additional support brackets as necessary.
- 4.4 The Type BA device shall be installed above the ground at a height that enables effective inspection and maintenance. The minimum height from the ground or floor level or the base of any cabinet to the underside of the exit port of the relief valve shall not be less than 300mm. The maximum height from the ground or floor level shall not be more than 1.5m.
- 4.5 Except for the closure of secure cabinet doors and lids there shall be free access for the maintenance of the assembly and the use of test equipment.

¹ Specific requirements may apply to fire protection systems.

Type of installation/appliance	Fluid Category	
	5	4
General		
Fire sprinkler systems using anti-freeze solutions.		●
Industrial cisterns	●	
Non-domestic hose union taps	●	
Permeable pipes in other than domestic gardens, laid below or at ground level, with or without chemical additives.	●	
Primary circuits and central heating systems larger than 45kW design output in other than a house.		●
Reclaimed water systems.	●	
Urinals, WC pans and bidets.	●	
Domestic or residential gardens		
Mini-irrigation systems without fertiliser or insecticide application; such as pop-up sprinklers or porous hoses.		●
Food processing		
Bottle washing apparatus		●
Butchery and meat trades.	●	
Dairies.		●
Food preparation.		●
Slaughterhouse equipment.	●	
Vegetable washing.	●	
Medical		
Any medical or dental equipment with submerged inlets.	●	
Bedpan washers.	●	
Commercial clothes washing plant in health care premises.	●	
Domestic appliances such as sinks, baths and washbasins.	●	
Hospital dialysing machines.	●	
Laboratories.	●	
Mortuary and embalming equipment.	●	
Catering		
Bottle washing apparatus.		●
Commercial dishwashing machines		●
Dishwashing machines in health care premises.	●	
Refrigerating equipment.		●
Vegetable washing.	●	
Industrial and Commercial		
Brewery and distillation plant.		●
Car washing and degreasing plants.		●
Commercial clothes washing plants.		●
Drain cleaning plant.	●	
Dyeing equipment.		●
Industrial and chemical plant etc.	●	
Industrial disinfection equipment.		●
Laboratories (other than secondary school laboratories).	●	
Mobile plant, tankers and gully emptiers.	●	
Printing and photographic equipment.		●
Water storage for agricultural purposes.	●	
Water treatment plant or softeners using other than salt.		●
Water storage for fire fighting purposes.	●	
Commercial agricultural		
Commercial irrigation outlets below or at ground level and/or permeable pipes, with or without chemical additives.	●	
Commercial hydroponics systems	●	
Insecticide or fertiliser applications.	●	

- 4.6 For assemblies of DN15 to DN50 (nominal bore) there shall be a minimum of 50mm horizontal clearance from any protrusion or surface at the rear of the assembly and any rear wall or rear face of any cabinet. For assemblies of DN65 to DN250 (nominal bore) there shall be a minimum of 100mm clearance at the rear of the assembly. (see Fig.1).
- 4.7 Every assembly shall be installed with resilient seat isolation valves at both inlet and outlet (if not incorporated within the assembly) so that the internal components of the assembly may be inspected, tested and replaced as necessary.
- 4.8 Following installation the assembly shall be flushed and disinfected in accordance with the guidance in BS 6700, 'Design, installation, testing and maintenance of services supplying water for domestic use within buildings or their curtilages'.
- 4.9 Following flushing and prior to commissioning and site test the assembly shall be checked by the installer to ensure that the relief valve functions correctly as follows:
- 4.9.1 With the downstream isolation valve closed, ease open the upstream test point to remove air. The procedure shall be repeated for the intermediate and downstream zones.
- 4.9.2 When all the air in the system is removed the upstream isolation valve should be closed.
- 4.9.3 The upstream test port valve is then eased open, releasing the upstream pressure on the diaphragm. The relief valve should then open automatically, discharging the water in the intermediate zone through the relief valve mechanism.
- 4.9.4 The exercise must be repeated no less than four times to ensure that the relief valve mechanism is not sticking closed or failing to seal.
- 4.10 The assembly may now be commissioned and site tested (See Section 5)

Notes:

The list of examples shown left for each fluid category is not exhaustive.

Fluid category 5 risks can only be protected by the use of the appropriate family 'A' device.

Fluid category 4 risks may be protected by family 'A' or by a 'BA' device.

Fluids containing environmental micro-organisms of potential health significance are Fluid Category 4. All fluids containing micro-organisms which can cause human illness (pathogenic organisms) are Fluid Category 5.

All proposed installations of Type BA devices must be submitted to the local Water Supplier for approval.

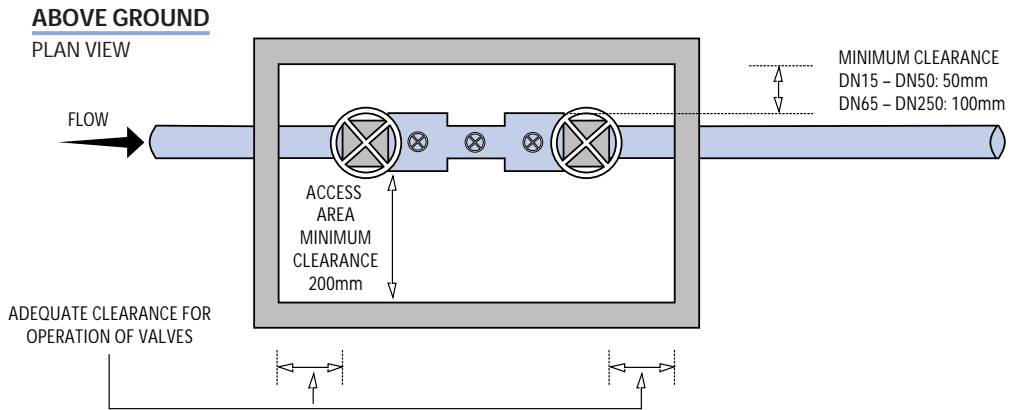
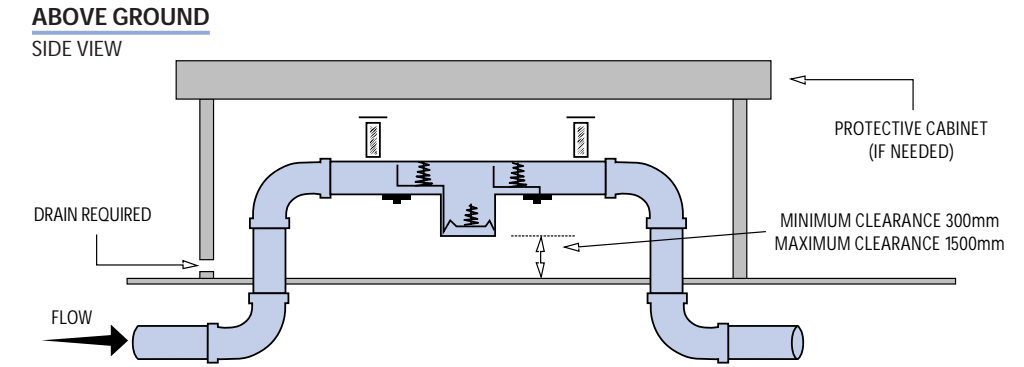
The Water Supplier retains the right to 'veto' decisions and determine the fluid category risk assessment.

'Installations' carried out by 'Approved Contractors' must be certified as being compliant with Regulations.

FIG 1

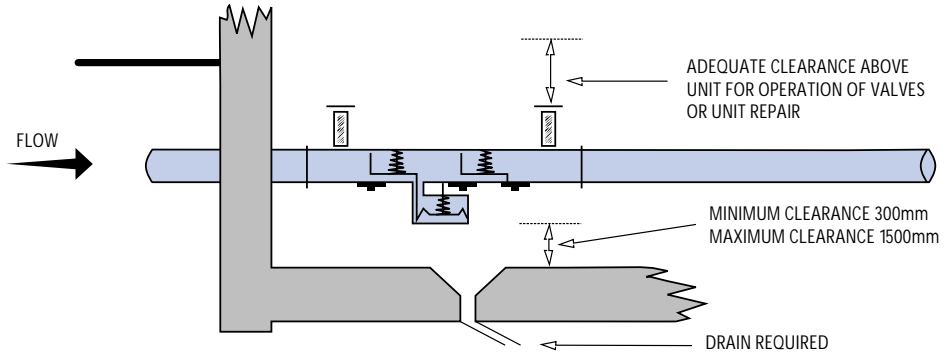
Type BA (Reduced Pressure Zone Backflow Preventer)

Typical installations with minimum clearance



IN BUILDING

SIDE VIEW

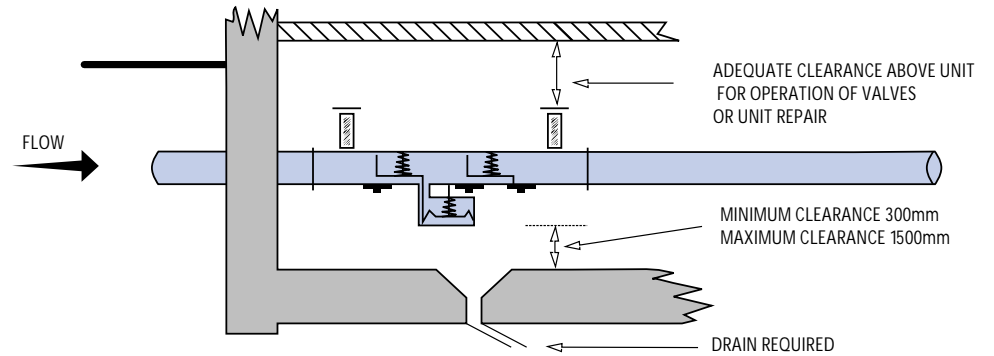


NOTE:

A strainer shall be installed upstream of the Type BA device if not an integral part of the device

IN BASEMENT

SIDE VIEW



5. On-site Inspection and Testing

5.1 GENERAL

Site testing of a Type BA device must only be carried out by an accredited tester approved by the Water Supplier as being competent to test the assembly. Testing shall be carried out at intervals specified by the Water Supplier but at intervals not exceeding 12 months. This requirement also applies to replacement assemblies. It is permissible, subject to the agreement of the water supplier, for a BA device to be tested prior to the expiry of a current test period. The acceptable timing shall be:

- Up to 30 days prior to the expiry of any test period of 6 months or more
- Up to 14 days prior to the expiry of any test period of less than 6 months.

The expiry of the new test period under this agreement will be taken from the date of expiry of the current test period.

5.2 COMMISSIONING AND REGULAR TEST DATA

The specimen test report form on page 8 is designed for the collection of test data during commissioning of the assembly and at subsequent prescribed intervals.

5.3 INSPECTION AND TESTING

5.3.1 Assemblies shall be inspected to establish:

- (a) Accessibility.
- (b) The measurements of air-gaps at drain points.
- (c) The satisfactory function of the strainer (debris to be removed if present).
- (d) Conformity with the recommendations for assemblies (see Section 4).

5.3.2 The function of all Type BA devices and associated fittings (see Figs. 2a and 2b) shall be tested to establish:

- (a) The function of the relief valve (opening and closing).
- (b) Water tightness of checkvalves.
- (c) No.1 checkvalve differential.
- (d) Relief valve opening differential pressure between zone 1 and zone 2.
- (e) Water tightness of isolating valves as appropriate.
- (f) Water tightness of obturators, diaphragms, pistons and seals.
- (g) Any supplementary information required by the water supplier.

5.3.3 In the event of a valve failing a test, it should be repaired or replaced and satisfactorily re-tested. Where this cannot be done within 24 hours of the initial test failure, the water supplier must be informed immediately. The water supplier will assess the nature of the test failure and whether the risk of backflow requires the water supply to the valve to be shut off or other measures taken to minimise the risk.

5.3.4 On completion of a site test, a 'test report' certificate must be completed by the tester in accordance with guidance set out in Section 6 and copies submitted to the water supplier and the person responsible for the device.

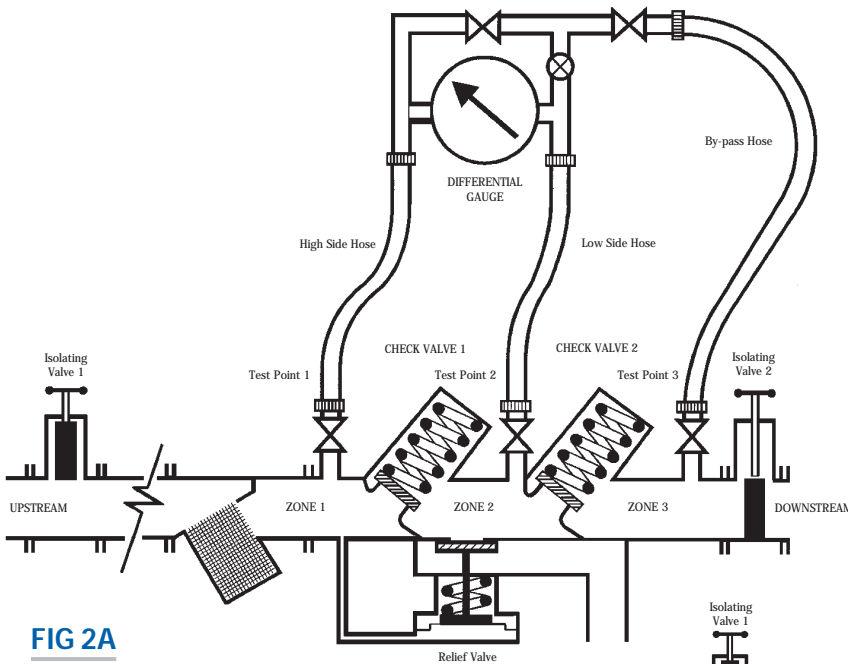


FIG 2A
Reduced Pressure
Principle Test Assembly
Example A

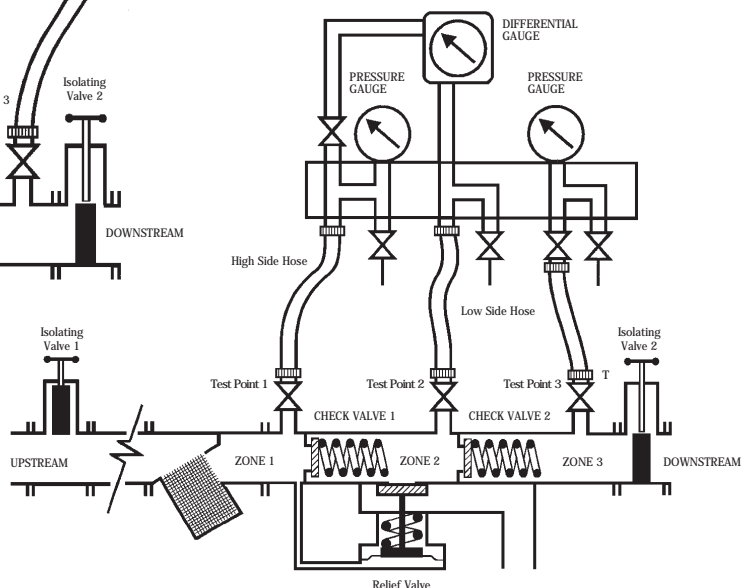


FIG 2B
Reduced Pressure
Principle Test Assembly
Example B

6. Record of Installation and Test Data

6.1 DUTIES AND RESPONSIBILITIES

Testing for defects and subsequent maintenance of the Type BA device is critical to its function. Terms and Conditions for the supply of water for non-domestic purposes may be made for controlling the installation of a Type BA device. These Terms and Conditions will require a record to be kept of each assembly.

6.2 RECORDS

6.2.1 The record shall indicate the precise location of the assembly, its purpose, and include data pertaining to prescribed tests, their frequency, any defects that are found and the measures taken to remedy those defects. It must also include details of the person who carried out the test.

6.2.2 Installation, commissioning and subsequent test data shall be forwarded to the Water Supplier and copies retained by the Tester and the Water Supplier's customer for a period of at least five years.

6.2.3 A specimen application form and a test report form are provided. These have been prepared using 'Microsoft Access' – a relatively low cost database package that is adaptable for the purpose and is available from the Water Regulations Advisory Scheme.

6.2.4 All records relating to tests carried out on each Type BA device must indicate:

- (a) The results of tests performed.
- (b) Details and calibration dates of test equipment at least annually and following damage or repair.
- (c) Inspection and test data is available from the customer.
- (d) Comments.
- (e) Information to identify the tester and the tester's accreditation.
- (f) Date and time of commencement and of completion of inspection.

7. The Water Supplier

7.1 A record of all Type BA devices installed should be established by the Water Supplier. In addition to the establishment of the records referred to in Sections 5 and 6 above, and for the purpose of making records which will be available to the relevant Government Department's Inspector on request, a Water Supplier should:

- (a) Ensure that the customer is informed of his obligations regarding the device.
- (b) Follow up if test results are not returned by the due dates.
- (c) Monitor or check verification tests, any other tests undertaken and any action taken as a result and, if necessary, check test results against previous test results for that device.
- (d) Amend records to show any change of ownership of the site or valve.

Appendix 1

A1 TRAINING AND ACCREDITATION REQUIREMENTS

A1.1 The efficient operation of an assembly and continued dependence on it can only be assured through a programme of regular testing and maintenance.

A1.2 At intervals not exceeding twelve months the Water Supplier will require a certificate of proof that the Type BA device has been tested and is working correctly.

A1.3 Testing of the assembly must only be carried out by an accredited tester approved by the Water Supplier as competent to test Type BA devices.

A1.4 For the accreditation of an approved tester:

- (a) Accreditation will be by bodies or arrangements approved by the Water Supplier.
- (b) Training will follow an water industry approved curriculum. A curriculum is in preparation by the Water Regulations Advisory Scheme on behalf of the industry.

A1.5 Training will include:

- (a) *Installation*: Installation requirements and siting of the assemblies, including identification of contamination risks.
- (b) *Maintenance*: Theoretical and practical training in the maintenance of assemblies.
- (c) *Testing*: Theoretical and practical training in the testing of assemblies.
- (d) *Records*: Record keeping and administration.

A2 ASSESSMENT AND CERTIFICATION OF TESTERS

A2.1 Candidates will undertake assessment in:

- (a) Theoretical knowledge of assemblies, their application, installation and operation;
- (b) Practical knowledge of the installation, maintenance and testing of the assemblies, including the keeping of appropriate records.

Updated by:

WRAS Technical Support Group – Backflow Group

Further copies and technical information may be obtained from:

Water Regulations Advisory Scheme,
Fern Close,
Pen-y-Fan Industrial Estate,
Oakdale,
Gwent NP11 3EH.

Tel: +44 (0)1495 248454

Fax: +44 (0)1495 249234

E-mail: info@wras.co.uk

Website: www.wras.co.uk

RPZ VALVE ASSEMBLY – Application for installation

Name and address of Company seeking approval:

Telephone:

Date of application:

Name of company and address of intended location of valve:

Telephone:

Name and address of Water Supplier's customer if different:

Telephone:

Name and address of Water Supplier:

Telephone:

Name of person on site to be responsible for arranging of testing:

Intended location of valve on site (which building?):

Type of plant/equipment to be supplied:

Proposed installation company (if known):

Telephone:

SPECIMEN FORM

Temporary arrangement?

Permanent arrangement?

Point-of-use protection?

Zone protection?

Whole site protection?

Make of intended valve:

Model No:

Serial No (if known):

Valve WRAS Approved?

Sketch of proposed installation:

Water Supplier's Use Only

Water Supplier:

Area:

Risk Assessment: 1 2 3 4 5*

Fluid category – Please tick

*RPZ valves will be excluded from use where a Class 5 Fluid is considered by the Water Supplier to be the backflow risk – that is, a fluid representing a serious health hazard (to the domestic or mains water supply) because of the presence of microbiological, viral, radioactive or very toxic substances.

Application approved:

Application rejected:

Authorised by (name in CAPITALS):

Signature:

Date:

RPZ VALVE TEST REPORT FORM

Name of Company owning the valve:

Name of Water Supplier's customer if different:

Name of Water Supplier:

Address of location of valve:

Telephone

Location of valve on site (which building?):

Type of plant/equipment being supplied:

Installation company (if known):

Telephone

Date of installation of valve:

Date of commissioning (first test):

SPECIMEN FORM

Signature:

Permission to turn off the supply given by (Capital Letters):

Time of turn off: (24 hour clock)

Meter reading (if applicable):

Make of valve:

Accessibility and clearances:

Size (mm):

Unobstructed drain airgap?:

Model No:

Strainer present?:

Serial No:

Isolating valve No 2 tight?:

	CHECK VALVE 1	RELIEF VALVE	CHECK VALVE 2	CHECK VALVE 1	CHECK VALVE 2
INITIAL TEST	Closed Tight? <input type="text"/> Leaked? <input type="text"/>	Opened at Bar: <input type="text"/>	Closed Tight? <input type="text"/> Leaked? <input type="text"/>	Differential Pressure Bar: <input type="text"/>	Differential Pressure Bar: <input type="text"/>
REPAIRS AND MATERIALS USED					
TEST AFTER REPAIR	Tight? <input type="text"/> Leaked? <input type="text"/>	Opened at Bar: <input type="text"/>	Tight? <input type="text"/> Leaked? <input type="text"/>	Differential Pressure Bar: <input type="text"/>	Differential Pressure Bar: <input type="text"/>

Tester's name in capitals:

Signature of tester:

Turn on time (24hr clock):

Date of completion of test:

Testers No.:

Date for next test:

Testers address

Comments

Expand onto a separate sheet if required