



Metropolitan Domestic Water Improvement District
Backflow Prevention Control Program
May 11, 2015

Section 1. Purpose

- (a) To protect the public potable water supply of Metropolitan Domestic Water Improvement District (Metro Water District) from the possibility of contamination or pollution by preventing the backflow of contaminants and pollutants into the public potable water supply system.
- (b) To promote the elimination or control of existing cross-connections, actual or potential, with a customer's internal potable water system, plumbing fixtures and industrial piping systems.
- (c) To provide for a continuing program of cross-connection control which will prevent the contamination or pollution of the public potable water supply system.
- (d) To implement the requirements of AAC R18-4-215 requiring public water systems to protect against backflow, this article shall be construed and applied consistent with the requirements of AAC R18-4-215.

Section 2. Backflow Prevention Required

- (a) An approved backflow prevention method shall be utilized or installed at every service connection to a customer's water system or at any usage point in the water system when Metro Water District determines that the potable water supplied by the public potable water system may be subject to contamination, pollution or other deterioration in sanitary quality of conditions within the customer's water system.
- (b) The backflow prevention method to be utilized or installed shall be determined by Metro Water District. The method required by Metro Water District shall be sufficient to protect against the potential degree of hazard, as determined by Metro Water District to the public potable water supply from the customer's water system.

Section 3. Hazard Potential

The degree of hazard potential to the public potable water supply and system from a customer's water supply system shall be determined using the following hazard factors:

- (a) Contamination: Any condition, device or practice which, in the judgement of Metro Water District, may create a danger to the health and well-being of the potable water customers.
- (b) Cross-Connection: An actual or potential plumbing-type connection that is not properly protected by an approved backflow prevention method.
- (c) Hazard: An actual or potential threat which may cause severe damage to the physical facilities of the public potable water supply system or which may have a protracted effect on the quality of the potable water in the system.
- (d) Pollution: An actual or potential threat to the physical facilities of the public potable water supply system or to the public potable water supply which, although not dangerous to health, would constitute a nuisance or be aesthetically objectionable, or could cause damage to the system or its appurtenances.

Section 4. Backflow Prevention Methods

- (a) A backflow prevention method shall be any assembly or other means designed to prevent backflow. The following are the recognized backflow prevention methods which Metro Water District may require under this section.
 - (1) Air-Gap: The unobstructed vertical distance through the free atmosphere between the opening of the pipe or faucet supplying potable water to a tank, plumbing fixture or other device. An approved air gap shall be at least double the diameter of the supply pipe or faucet and in no case less than one (1) inch.
 - (2) Reduced Pressure Principle Assembly (hereinafter "RPA"): An assembly containing two independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves, and at the same time below the first check valve. The assembly shall include properly located test cocks and tightly closing shut-off valves located at each end of the assembly and fitted with properly located test cocks.
 - (3) Double Check Valve Assembly (hereinafter "DCVA"): An assembly composed of two independently acting, approved check valves, including tightly closing shut-off valves located at each end of the assembly and fitted with properly located test cocks.

- (4) Pressure Vacuum Breaker Assembly (hereinafter “PVB”): An assembly containing an independently operating, loaded check valve and an independently operating, loaded air inlet valve located on the discharge side of the check valve. The assembly shall be equipped with properly located test cocks and tightly closing shut-off valves located at each end of the assembly.
- (b) A backflow prevention method may be approved by Metro Water District if it has received the approval of the foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California and, for assemblies, has a local manufacturer’s parts and service center.
- (c) Metro Water District shall maintain a list of approved backflow prevention assemblies, by type and manufacturer. The list shall be available to any customer required to install a backflow prevention assembly.

Section 5. Backflow Prevention Methods Required

- (a) Whenever the following items exist or activities are conducted on premises served by the public potable water system, a potential hazard to the public water supply shall be presumed, and a backflow prevention method of the type specified herein for that item or activity must be utilized or installed at each service connection for that premise. The type and size of the assembly shall be determined by Metro Water District.
 - (1) Cooling tower, boiler, condenser, chiller, and other cooling systems utilizing potable water: RPA
 - (2) Tank, vessel, receptacle, and all other water connections including mobile units without approved air gap (except emergency vehicles and private swimming pools): RPA
 - (3) Ice maker (other than a residential service): RPA
 - (4) Water cooled equipment, boosters, pumps or autoclaves: RPA
 - (5) Water treatment facilities and all water processing equipment (other than residential water softeners): RPA
 - (6) Bottle washer, bedpan washer, garbage can washer: RPA
 - (7) Pesticide, herbicide, fertilizer, and chemical applicators (other than typical in-home use): RPA
 - (8) Aspirator: RPA

- (9) Commercial dishwashers, food processing and/or preparation equipment, carbonation equipment, or other food service processes utilizing potable water: RPA
- (10) Decorative fountain, baptismal, or any location water is exposed to atmosphere: RPA
- (11) X-ray equipment, plating equipment, or any other photographic processing equipment utilizing potable water: RPA
- (12) Auxiliary water supply and/or connections to unapproved water supply systems: RPA
- (13) Reclaimed water customers: RPA
- (14) Recreational vehicle dump stations (sewer), or any other location where potable water may be exposed to bacteria, virus, or gas: RPA
- (15) Any premises on which chemicals, oils, solvents, pesticides, disinfectants, cleaning agents, acids or other pollutants and/or contaminants are handled in a manner by which they may come in direct contact with potable water, or there is evidence of the potential to contact potable water (other than typical, infrequent in-home applications): RPA
- (16) Materials and piping systems unapproved by the Uniform Plumbing Code (UPC) or Environmental Protection Agency for potable water usage (for fire systems see the following listings: 20, 21 & 22): Contaminant: RPA – Pollutant: DCVA
- (17) Separately metered or unprotected irrigation systems, and construction water services: RPA or PVB as allowed.
- (18) Any premises where a cross-connection is maintained or where internal backflow protection is required pursuant to the Uniform Plumbing Code: RPA
- (19) Multi-metered properties with more than one meter connected to another or any building three stories or greater than 34 feet in height from service level: DCVA
- (20) It is recommended that new Class 1 and Class 2 Fire systems constructed of (non potable) black iron piping have minimal protection of: DCVA
- (21) Fire systems – Classes 3, 4, 5 and 6: RPA

- (22) Fire systems which require backflow protection and where backflow protection is required on the industrial / domestic service connection that is located on the same premises, both service connections will have adequate backflow protection for the highest degree of hazard affecting either system: RPA
 - (23) Any premises which has a source of water supply that is not accepted by Metro Water District and or not approved by the Arizona Department of Environmental Quality: As determined by Metro Water District.
 - (24) Any premises where an unprotected cross-connection exists or where there has previously occurred a cross connection problem within the premises: As determined by Metro Water District.
 - (25) Any premises where there is a significant possibility that a cross-connection problem will occur and entry onto the premises is restricted to the extent that cross-connection inspections can not be made with sufficient frequency or on sufficiently short notice to assure that unprotected cross-connections do not exist: As determined by Metro Water District.
 - (26) Multi-use commercial property: RPA
 - (27) Properties with active private wells: RPA.
 - (28) Consecutive systems, when required by Metro Water District: RPA
 - (29) Fire hydrant/construction water: RPA or Air Gap
 - (30) Jumper connection to new water mains: RPA.
 - (31) Any premise on which there is a pressurized gray water system: RPA
 - (32) Any premise on which there is pressurized rain water harvesting system: RPA.
- (b) When two or more of the activities listed above are conducted on the same premises and served by the same service connection or multiple service connections, the most restrictive backflow prevention method required for any of the activities conducted on the premises shall be required to be utilized or installed at each service connection. The order of most restrictive to least restrictive backflow prevention methods shall be as follows:
- (1) Air Gap (most restrictive)

- (2) Reduced Pressure Principle Assembly (RPA)
- (3) Double Check Valve Assembly (DCVA)
- (4) Pressure Vacuum Breaker Assembly (PVB) (least restrictive)

Section 6. Backflow Assembly Installation Requirements

- (a) Backflow prevention assemblies shall be installed by the customer, at the customer's expense and in compliance with the standards and specifications adopted by the Metro Water District, at each service connection. The assembly shall have a diameter at least equal to the diameter of the service connection.
- (b) The reduced pressure principle assembly, pressure vacuum breaker assembly, and the double check valve assembly shall be installed above ground.
- (c) When a customer desires a continuous water supply, two backflow prevention assemblies shall be installed parallel to one another at the service connection to allow a continuous water supply during testing of the backflow prevention assemblies. When backflow prevention assemblies are installed parallel to one another, the sum of the cross sectional areas of the assemblies shall be at least equal to the cross sectional area of the service connection.
- (d) No person shall alter, modify, bypass or remove a backflow prevention method without the approval of the Metropolitan Domestic Water Improvement District.

Section 7. Installation of Backflow Prevention Assemblies for Fire Systems

In addition to the requirements of Section 6, the following shall also apply.

- (a) Fire Systems – Fire protection systems consist of sprinklers, hose connections, and hydrants. Sprinkler systems may be dry or wet, open or closed. Systems of fixed-spray nozzles may be used indoors or outdoors for protection of flammable-liquid and other hazardous processes. It is standard practice, especially in cities, to equip automatic sprinkler systems with fire department pumper connections.

A meter (compound, detector check) should not normally be permitted as part of a backflow prevention assembly. An exception may be made, however, if the meter and backflow prevention assembly are specifically designed for that purpose.

For cross-connection control, fire protection systems shall be classified on the basis of water source and arrangement of supplies as follows:

Class 1 – District connections from public water mains only; no pumps, tanks, or reservoirs; no physical connection from other water supplies; no antifreeze or other additives of any kind; all sprinkler drains discharging to atmosphere, dry wells, or other safe outlets.

Class 2 – Same as Class 1, except that booster pumps may be installed in the connections from the street mains. It is necessary, however, to avoid drafting so much water that pressure in the water main is reduced below 20 psi.

Class 1 and Class 2 Fire Systems are exempt per R18-4-215

Class 3 – Direct connection from public water supply main plus one or more of the following: Elevated storage tanks; fire pumps taking suction from above-ground covered reservoirs or tanks; and pressure tanks (all storage facilities are filled or connected to public water only, the water in the tanks to be maintained in a potable condition).

Class 4 – Directly supplied from public mains similar to Classes 1 and 2, and with an auxiliary water supply on or available to the premises; or an auxiliary supply may be located within 1,700' of the pumper connection. Class 4 systems will normally require backflow protection at the service connection. The type (air gap or reduced pressure) will generally depend on the quality of the auxiliary supply.

Class 5 – Directly supplied from public mains, and interconnected with auxiliary supplies, such as: pumps taking suction from reservoirs exposed to contamination, or rivers and ponds; driven wells, mills or other industrial water systems; or where antifreeze or other additives are used. Classes 4 and 5 systems normally would need maximum protection (air gap or reduced pressure) to protect the public potable-water system.

Class 6 – Combined industrial and fire protection systems supplied from the public water mains only, with or without gravity storage or pump suction tanks. Class 6 system protection would depend on the requirements of both industry and fire protection, and could only be determined by a survey of the premises.

- (b) When a backflow prevention assembly is required for a water service connection supplying water only to a fire system, the assembly shall be installed on the service line in compliance with standard specifications adopted by the Metro Water District. (Installation of DCVA's or DCVA's in a vertical position on the riser may be allowed on fire systems with approval of Metro Water District.)

Section 8. Inspection

A Customer's water system shall be available at all times during business operations for premises inspection by Metropolitan Domestic Water Improvement District. The inspection shall be conducted to determine whether any cross connection or other hazard potentials exist and to determine compliance with this article.

Section 9. Permit Required

- (a) Installation permits for the installation of all backflow prevention assemblies shall be obtained from Metro Water District prior to installation. A separate permit shall be obtained for each required backflow prevention assembly to be installed, including replacement.
- (b) Notification – It shall be the duty of the person doing the work authorized by the permit to notify Metro Water District, orally or in writing not less than twenty-four (24) hours before the work is to be inspected. Said work shall be inspected only if there is reason to believe that the work done will meet UPC and current USC standards, as are referenced in the backflow prevention manual.
- (c) Stop Orders – Whenever any work is being done contrary to the provisions of the UPC or this code, Metro Water District or an authorized representative may order the work stopped by notice in writing served on any person engaged in the doing or causing such work to be done, and any such person shall forthwith stop such work until authorized by Metro Water District to proceed with the work.
- (d) Suspension or Revocation – Metro Water District may, in writing, suspend or revoke a permit issued under provisions of this Code, whenever the permit is issued in error or on the basis of incorrect information supplied, or in violation of any ordinance or regulation of any provision of the UPC or this code.

Section 10. Test, Maintenance, Records

- (a) The customer shall test and service backflow prevention assemblies at least once a year. If the testing reveals the assembly to be defective or in unsatisfactory operating condition, the customer shall perform any necessary repairs, including replacement or overhaul of the assembly, if necessary, which will return the assembly to satisfactory operating condition.
- (b) If Metro Water District or a customer learns or discovers, during the interim period between test, that an assembly is defective or in unsatisfactory operating condition, the customer shall perform any necessary repairs,

including replacement or overhaul of the assembly, if necessary, which will return the assembly to satisfactory operating condition.

- (c) The annual testing shall be performed by an individual certified to conduct such testing by an agency approved by Metro Water District. A list of certified, approved and recognized individuals will be maintained by Metro Water District and will be available upon request to all person required to install or maintain a backflow prevention assembly. A certification issued to a backflow prevention assembly tester may be revoked or suspended for improper testing, maintenance, reporting or other improper practices.
- (d) The customer shall maintain records, on forms approved by Metro Water District, of the results of all tests and all servicing, repairs, overhauls or replacements of the backflow prevention assembly. A copy of the records shall be promptly submitted to Metro Water District after completion of the activity for which the record is made.
- (e) Fire systems shall not be out of service for more than 8 (eight) consecutive hours due to testing, maintenance, or repairs and the appropriate fire district and alarm company shall be notified prior to outage. Metro Water District shall be notified immediately of any changes in fire service status.

Section 11. Modification of Backflow Prevention Requirements

If Metro Water District determines, after inspection of the customer's system, that a backflow prevention method less restrictive than that required in Section 5 will provide adequate protection of the public potable water supply from the degree of hazard potential by the customer's water system, Metro Water District may, at its sole discretion, modify the requirements of Section 5 accordingly.

Section 12. Discontinuance of Water Service

- (a) If Metro Water District discovers that a customer has not installed a required backflow prevention method or that a backflow prevention method has been improperly tested or maintained, bypassed or removed, or that an unprotected cross/connection exists in the customer's water system, the water service to that service connection shall be disconnected if the situation is not remedied within the time specified in the notice sent to the customer as required by this section. The service shall not be restored until the condition is remedied.
- (b) Water service to a fire sprinkler system shall not be subject to a disconnection under this section. If a situation, which would otherwise result in discontinuance of water service in subsection (a) above, is not

remedied within the time provided in the notice sent to the customer, domestic water service to the property may be disconnected as above.

- (c) Prior to disconnecting any water service because a condition set forth in subsection (a) or (b) above exists, Metro Water District shall issue a notice to the customer describing the condition and notifying the customer that the condition must be remedied within forty-five (45) days from the initial inspection date. If there is not immediate action on the part of the customer, a second notice by certified mail shall be sent thirty (30) days after the initial inspection date stating that water service will be disconnected within fifteen (15) days of the second notice. If there is still no action, a turn off notice shall be sent to the customer stating that service will be disconnected (approximately seven (7) days from the date of the turn off notice (for retrofit notification procedures, see Section 13 – 15).
- (d) Metro Water District may disconnect, without notice, water service to any customer when Metro Water District discovers that a direct, contaminated cross connection exists in the customer's water system.

Section 13. Administrative Appeal

An administrative appeal may be requested whenever a violation or dispute of any of the requirements of this Ordinance is determined, whether during construction or at the plan review stage, and the applicant wishes to appeal the decision of the staff because of code interpretation, unreasonable hardship or other acceptable reasons. The appeal may be made to the Metro Water District Backflow Prevention Hearing Committee as follows:

- (a) The applicant shall file a written appeal on the forms provided by the Metro Water District Backflow Prevention Hearing Committee.
- (b) The appeal will be heard by the Metro Water District Backflow Prevention Hearing Committee within seven (7) days, at a regular specified time.
- (c) The Metro Water District Backflow Prevention Hearing Committee shall consist of the District Engineer, Utility Superintendent and the Utility Program Coordinator. Additional Inspectors or other technical persons may be added for a particular appeal, at the discretion of the Metro Water District Backflow prevention Hearing Committee.
- (d) Adequate information shall be provided by the applicant in order to fully describe the conditions in question.
- (e) The applicant may, but is not required to, personally attend the Metro Water District Backflow Prevention Hearing Committee meeting.

- (f) If an appeal is denied by the Metro Water District Backflow Prevention Hearing Committee, the applicant may appeal to the Metro Water District Board of Directors.

Section 14. Retroactive Application

- (a) The provisions of this article shall apply to all new water customers and users and existing prior to the enactment date of this article. Notwithstanding the foregoing, for multiple-metered premises presenting only a pollution hazard as defined in Section 3 existing as of the effective date of this ordinance, only one new or additional backflow prevention assembly shall be installed within forty five (45) days from the initial inspection notice and thereafter only one additional backflow assembly installation shall be required during any forty five (45) day period. Noncompliance may result in discontinuance of water service without further notice.
- (b) Backflow prevention assemblies installed prior to enactment of this article, and which do not comply with the requirements set forth herein, shall be replaced with assemblies which comply with the standards set forth herein.
- (c) Meters documented as running backwards or contamination conditions as defined in Section 3 shall be immediately addressed under Section 12, and the provisions of Subsection (a) of this section shall not apply to them.

Section 15. Fees

The fee for any permit required by the terms of this Article shall be the current adopted fees approved by the Metro Water District Board of Directors.

Section 16. Backflow and Cross Connection Manual Incorporated by Reference

All information not specifically set forth in this Article (Standard Details, etc.) will be a matter of public record and will be contained in the following documents:

- (a) Manual of Cross Connection Control, current edition accepted by AAC R18-4-215, Foundation for Cross Connection Control and Hydration Research, University of Southern California (as amended).
- (b) Tucson Water Standards and Specifications (as amended).