

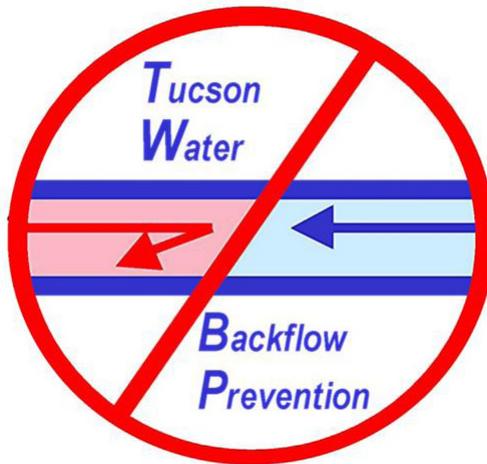
# DYE TESTING:

## Ensuring the Separation of Potable and Reclaimed Water Systems





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There are several ways of ensuring that the potable and reclaimed water systems are completely separated and that no cross-connections exist. Visual inspection, pressure testing and dye testing can each, when used appropriately, be used to identify cross-connections. For sites that are converting existing plumbing and irrigation systems to reclaimed water and for all schools and parks, Tucson Water uses a dye test to ensure that the systems are totally separate. For sites with new plumbing that Tucson Water has inspected during its installation, a pressure test may be used. All dye tests are conducted by a Tucson Water Cross-connection Control Specialist (CCC Specialist).

Before the reclaimed water meter is unlocked and service is initiated, Tucson Water conducts a thorough review of the site which includes a site inspection and a separation of systems test consisting of either a pressure or dye test.

## **Reclaimed Water Site Inspection**

During the site inspection, the Tucson Water CCC Specialist ensures that the site meets the regulatory requirements of the Arizona Department of Environmental Quality and Tucson Water, including verification that compliance issues and recommendations made during previous site visits have been addressed.

The CCC Specialist will also:

- Ensure that a reclaimed water user agreement has been signed
- Take the GPS readings of the site location
- Verify that reduced pressure backflow prevention assemblies (RPA) are installed on all potable water services, that they have been tested, and are in compliance
- Review existing irrigation plans or assist the customer in drawing conceptual plans
- Ensure that all existing hose bibs on proposed reclaimed water system are removed
- Verify that the meter box and all control boxes are painted purple, and that the reclaimed meter and control valves have identification tags
- Ensure that reclaimed sign(s) are installed in an appropriate location(s)
- Check the operation of the irrigation system, using potable water to identify ponding, runoff, and overspray onto eating areas, drinking fountains and parking lots
- Ensure that any existing backflow prevention assemblies on the proposed reclaimed irrigation system are removed and that the potable water connection is capped

## Preparing the Site for Dye Testing

The customer is responsible for preparing the site for dye testing. Site preparation includes:

- Installation of reduced pressure backflow prevention assemblies (RPA) on all potable water services in accordance with Tucson Water Standard Detail #1802. All assemblies must pass a final inspection by Tucson Water, and have passed an annual backflow compliance test performed by a certified backflow tester.
- Installation of a tee or wye strainer on the supply side of the RPA with a ½ or ¾ inch female pipe thread connection and a temporary hose bib and installation of a temporary male or female hose connection on the irrigation system (see Figure 1).
- Commercial and industrial sites are responsible for the installation of a temporary jumper assembly and dye port. Tucson Water will provide and install a temporary jumper assembly and dye port at residential sites.

**NOTE:** The irrigation system may not be connected to the reclaimed water meter until the dye test has been performed and it has been verified that no cross-connections exist.

Before beginning a dye test, the Tucson Water CCC Specialist will:

1. Check all site and as-built plans for any existing on-site piping as well as any public water mains to ensure that all connections have been identified.
2. Verify that potable water is available to use for the dye test and that the potable water system is protected by an approved RPA at each service connection.
3. Identify a suitable location for the jumper RPA and install it (commercial and industrial sites are responsible for providing and installing the temporary jumper RPA).
4. Using the hose bib connections shown in Figure 1, make the connection from the potable water system to the temporary jumper RPA which connects to the on-site reclaimed water system.

# Dye Test Procedure

Upon completion of steps 1-4 on page 3, the Tucson Water CCC Specialist will assume control of the site and begin the dye testing process.

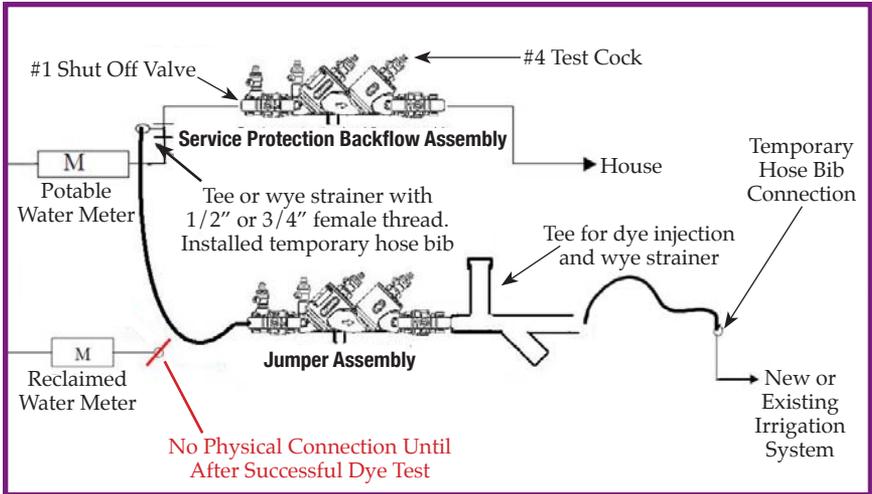


Figure 1: Required set-up for dye test. All dye testing is done with potable water

1. Turn off all potable water connections at the number one shut off valves on the service protection RPAs. Open all number four test cocks on the service protection RPAs to drain all potable water system pressure (Figure 2).



Figure 2: Draining water pressure through test cock #4

2. Add dye at the dye port (Figure 3).



*Figure 3: Dye is added through dye port on the temporary jumper assembly*

3. Turn on potable water to activate the jumper assembly and pressurize the irrigation system.

4. Activate, one at a time, each station of the irrigation system. Colored water should come out of each outlet. Ensure that all stations are checked, including all spray, drip and bubbler outlets (Figure 4).



*Figure 4: All irrigation stations are checked for the presence of colored water*

5. Turn on all internal and external potable water outlets while the irrigation system is pressurized. Verify that no water, either clear or colored comes out of the outlets (Figure 5). If any cross-connections are discovered, DO NOT PROCEED WITH THE TEST. Follow the Cross-connection Response Procedures on page 7.



*Figure 5: Colored water in internal fixtures indicates a cross-connection*

6. Verify that no water, either clear or colored, comes out of the number four test cocks of the RPA(s) (Figure 6). If any cross-connections are discovered, DO NOT PROCEED WITH THE TEST. Follow the Cross-connection Response Procedures on page 7.



*Figure 6: Colored water at the number 4 test cock indicates a cross-connection*

## **Completion of Dye Test**

- 1.If no cross-connections are found during testing, the site is ready to be connected to the reclaimed water system.
- 2.The temporary jumper assembly is removed from the irrigation system.
- 3.The hose bib connection on the service protection RPA is removed and a threaded plug is installed in the tee or wye strainer replacing the hose bib with a permanent plug.
- 4.The Tucson Water CCC Specialist unlocks the reclaimed water meter and authorizes the customer to connect the irrigation system to the reclaimed water meter.
- 5.All sites with reclaimed water service should be periodically re-inspected and tested for cross-connections either with a dye or pressure test.

## **Cross-connection Response Procedures**

In the event that a cross-connection is discovered during the dye test, immediate action is required:

- 1.Immediately turn off the jumper assembly going to the proposed reclaimed water system.
- 2.Turn on and pressurize the potable water system.
- 3.Assist in identifying the location(s) of backflow and eliminate the cross connection(s).
- 4.Flush & remove colored water from the potable water system.
- 5.Restart dye test procedures from step one.

# Notes





*If you require materials  
in an accessible format  
or in a language other than English,  
call Tucson Water  
at (520) 791-4331.  
City of Tucson TDD#: (520) 791-2639*



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