



SC DEPARTMENT of  
**ENVIRONMENTAL  
SERVICES**

SC Tester,

I hope this letter finds you well. This is a reminder that your tester certification expires this quarter. A list of recertification centers and a study guide are included in this packet.

There are some updates to the SC DES Certification program. A few important ones are below:

- 1) Test Equipment/Gauges are required to be certified/calibrated annually.
- 2) The test procedures were updated slightly. Start using the current test procedures. This includes testing the #2 shut-off valve on DCVA's. If you do not understand why this is important, reach out to Steve Fox and he will explain. It is a very important step many are missing.
- 3) SC DHEC separated into two new agencies on July 1<sup>st</sup>, 2024. We are now The South Carolina Department of Environmental Services (SC DES).

If you have any questions or concerns, please contact this office.

**Steve Fox**

Cross-Connection Control & Backflow Prevention - Bureau of Water **S.C.**

**Dept. of Environmental Services**

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# BACKFLOW PREVENTION RE-CERTIFICATION STATIONS

Below is a listing of the current re-certification stations for backflow prevention assembly testers in South Carolina. You must contact one of the recertification stations to schedule your recertification exam. **The proctor will provide you with dates, costs, and locations** of the next scheduled exam. The study guide material is attached for your review. Read the two pages as they will cover some of the questions you will see on the written exam.

Wm. David Zorn, Jr. <b>Zorn Consulting, LLC</b> 325 Banning St. Cope, SC 29038 Home: (803) 536-6387 Mobile: (803) 707-8153 wdz@zornconsulting.net	Robert Bird <b>Palmetto Alliance Institute</b> Oconee, Pickens & Anderson (864) 247-9111 WebSite: <a href="#">Click Here</a>	Mr. Kenneth Davis Spartanburg Area, Clinics held at Inman Campobello Water (864) 208-6334 or (864) 578-6365
Mr. Harry Peart <b>Rock Hill Area</b> (803) 324-0927 or (803) 417-1014	Mr. Roderick Herring <b>City of Columbia</b> Columbia Area (803) 545-3876	Mr. Malcolm Cook <b>City of Florence</b> Florence Area (843) 665-3236
Mr. Don Sondles <b>Charleston Water System</b> Charleston Area (843) 727-6980 Email: backflow@charlestoncpw.com Website: <a href="#">Click Here</a>	Mr. Matt McCoy/Mr. Charles Clinemyer <b>Greenwood C.P.W.</b> Greenwood Area (864) 942-8196	Mr. Brent Thomas <b>Grand Strand Water &amp; Sewer Auth.</b> Myrtle Beach / Conway Area (843) 234-8478  <b>Website:</b> <a href="#">Click Here</a>
	Mr. Nick Mincey <b>Grand Strand Water &amp; Sewer Auth.</b> Marion/Horry County Area 843-443-8214 NickMincey@gswsa.com  Website: <a href="#">Click Here</a>	

If you have any questions, please contact Mr. Steve Fox, SCDES, Bureau of Water, at  
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# STUDY GUIDE FOR RECERTIFICATION TEST

A **CROSS-CONNECTION** is defined as, “any actual or potential connection or structural arrangement between a public water system and any other source or system through which it is possible to introduce into any part of the potable system any used water, industrial fluid, gas or substance other than the intended potable water with which the system is supplied. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices, and other temporary or permanent devices through which or because of which backflow can or may occur are considered to be cross-connections”. A cross-connection can never be allowed. You either must remove the cross-connection from the plumbing system or it must be properly protected against backflow.

**Rules/Regs:** The State mandates R61.58.7(F) that all water systems/purveyors must have an active Cross-Connection Control Program. It is the Water System/Purveyor that tracks assemblies and enforces the testing and installation of backflow assemblies.

**Flow:** For water to flow there needs to be a difference in pressure and a pathway/link. Flow is what opens check valves inside of backflow prevention devices and assemblies, not pressure. It's the difference in pressure. If we have no flow, then the check valves in the backflow preventer would be in the closed position. For example, if a water system loses supply pressure, then the check valves in an assembly would be in the closed position. It's important to know how the Backflow Assemblies & Devices operate to trouble-shoot correctly.

**Backflow:** Is the reversal of the normal direction of flow. The two types of backflow are backsiphonage and backpressure. Backsiphonage occurs when the water distribution system drops below atmospheric pressure which is 14.7 psi at sea level. Backsiphonage may occur when there is a loss of pressure on the water distribution system, like when a break occurs in a large water main. Backsiphonage could also occur when a fluid's velocity increases as a result of flowing through a constricted area of piping, causing the pressure to decrease. This effect is known as Venturi or Aspiration. Backpressure occurs when internal plumbing pressure exceeds the supply pressure. Storage tanks, vessels, pumps and elevated piping supplied by water system/purveyor along with tank type water heaters may cause backpressure to the public water system.

**Double Check Valve Assem. (DCVA):** When testing a Double Check Valve Assembly there are two accepted methods. Differential Pressure and Direction of Flow. The DCVA is designed for a non-health hazard/low hazard category cross-connection under backsiphonage or backpressure. The maximum pressure loss acceptable through an approved DCVA is 10 psi. Both check valves in a DCVA must hold tight at **1.0 psid** or greater pressure differential. When testing a DCVA with a differential gauge using two hoses for the check valve differential. This test method is called **Differential Pressure**. The only shut-off valve you will close on the DCVA when performing the differential pressure test is the #2. The #1 shut-off valve must remain open to perform this differential pressure test. The first test is the tightness of the #2 Shut-off. This is because we need to verify the assembly is in a static (no flow) condition. If there is any flow through a DCVA then the values on the gauge will read higher and you may have a false pass.

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**Vacuum Breakers:** The Pressure Vacuum Breaker Assem. (PVB) must be installed a minimum of 12" above any downstream piping or use. The PVB is designed for a health/high hazard category cross-connection under Backsiphonage **only** meaning it is not approved or designed for backpressure. The PVB works under continuous pressure meaning you can install a shut-off valve downstream of a PVB. When testing the PVB and you connect the high hose to test cock #2, you are testing the air inlet valve (Test #1). When you connect the high hose to test cock #1, you are testing the check valve (Test #2). If either shut-off valve is leaking, you will notice water leaving the assembly via the gauge dropping to zero. The non-testable Atmospheric Vacuum Breaker (AVB) must be installed 6" above any downstream use or piping with no control valves downstream of the outlet. So no continuous pressure is allowed. The Hose Bibb Vacuum Breaker (HBVB) is the third vacuum breaker in the family. The PVB, AVB, and HBVB are all approved for backsiphonage only, not backpressure.

**Reduced Pressure Principle Assem. (RP):** When testing a Reduced Pressure Principle Assembly, the pressure differential relief valve must operate to maintain the zone between the two check valves at least **2.0 psid** less than supply pressure. Also, the second check valve on a RP must be **1.0 psid or greater**. When testing the first check valve on a RP, the acceptable value is **5.0 psid or greater**. If the RP is discharging water under a **flowing and non-flowing** condition the most obvious problem is a fouled differential pressure relief valve. However, if the RP is discharging water under a **non-flowing (static)** condition the most obvious problem is a failed first check valve. When testing the RP the only shut-off valve you close to perform the test is the #2. The #1 shut-off must always remain open. System water pressure is designed to keep the relief valve closed in a RP. This pressure is fed through the Sensing line to the relief valve. The spring in the relief valve is designed to always open in an effort to discharge water out of the vent. The first test is the tightness of the #2 Shut-off. This is because we need to verify the assembly is in a static (no flow) condition. If there is any flow through then the values on the gauge will read higher and you may have a false pass or the relief valve may not open.

**Fire Systems:** The State Primary Drinking Water Regulations require that fire line sprinkler systems in South Carolina must be protected with the minimum of an approved Double Check Valve Assembly. Detector Assemblies are sometimes required on fire sprinkler systems by public water systems in SC to detect leaks and/or someone stealing water. These have either a Type I or Type II metered bypass depending on the style. The Reduced Pressure Backflow Prevention Assembly is required when antifreeze, foaming agents, or an auxiliary water supply is tied into the fire line sprinkler system.

**Gauges:** Test gauges should be treated as instruments and not common tools. Needle valves do not need to be turned off to the point they are too tight. Just "snug" the valves to help avoid damaging them. All valves on the gauge should be opened at the end of test and hoses shaken to get water out. Please store gauges with valves open and in a safe & secure manner to avoid damage. Gauges are required to be certified/calibrated annually.

**\*\* This study sheet is not designed to cover every question which is found on the recertification test. There are several questions pertaining to trouble shooting and testing assemblies as well as some general knowledge questions which you, as a tester are expected to already know. If you have been properly testing assemblies in the past, you should not have any problems with those questions. If you have not been properly testing, diagnosing, and repairing assemblies then the place to be retrained for that is in the four-day seminar or one of the repair courses offered. The purpose of the recertification testing is not to teach the course over again, but to allow qualified testers to demonstrate their qualifications. \*\***