The Series BTK Backflow Prevention Test Kit is capable of testing hydronic systems with test procedures including those recommended by ASSE, AWWA, CSA, FCCC, HR-USC and NEWWA. It possesses a quick release latch pin mechanism and a new manifold design. The tests can be performed with the gage mounted in the case or removed from the case. The BTK is comprised of five valves and is specially designed for testing backflow prevention assemblies. The 90-micron filters protect the test kit to minimize plugging with scale and sand. Filter elements can be cleaned or replaced. The Kit includes a diaphragm differential pressure gage (4.5”, 0-15 PSID), a line pressure gage (1.5”, 0-200 PSIG), a 4 feet long bleed tube, three 5 feet long hoses (color-coded), three sets of brass adapter fittings provided for hookup to all standard size test cocks, and a durable molded polyethylene carrying case with removable lid.

NOTE: IT IS THE TESTER’S RESPONSIBILITY TO DETERMINE THE ACCEPTANCE OF THIS PROCEDURE BY LOCAL AUTHORITIES.

TEST SET UP:
1. Obtain permission to shut off the water supply.
2. Determine the direction of flow.
3. Identify all 4 test cocks.
4. All test kit valves are closed.

TEST NO. 1
DOES THE DIFFERENTIAL PRESSURE RELIEF VALVE OPERATE TO MAINTAIN THE "ZONE" BETWEEN THE TWO CHECK VALVES AT LEAST 2 PSI LESS THAN THE SUPPLY PRESSURE?

1. Open test cock 4 to establish flow through the RP. Flush test cocks in the following order taking care not to dump the relief valve. Open and close test cock 1. SLOWLY open and close test cock 2. Open and close test cock 3. Close test cock 4. Install appropriate adapters in all test cocks.
2. Connect the red hose between test cock 2 and the high side (back, middle) connection on the test kit.
3. Connect the green hose between test cock 3 and the low side (back, right) connection on the test kit.
4. Slowly open test cock 3. Bleed the low side by opening the bleed low (top, right) valve.
5. Slowly open test cock 2. Bleed the high side by opening the bleed high (top, left) valve. Close the bleed high (top, left) valve.
6. After the gage reaches the upper part of the scale, close the bleed low (top, right) valve.
7. Close the No. 2 shutoff valve and observe the pressure drop across check valve 1. Should the pressure drop until the relief valve discharges continuously, check valve 1 is leaking and must be repaired before continuing.
8. Open the high (bottom, middle, red) valve.
9. Open the low (bottom, right, green) valve no more than one quarter (1/4) turn.

SPECIFICATIONS
Service: To test water systems for backflow.
Housing Material: Gage: Glass Reinforced Engineered Thermoplastic; Case: Polyethylene.
Accuracy: ±0.2 PSI (Descending).
Pressure Limits: Working pressure: 200 PSIG.
Temperature Limits: Maximum 150°F / 65°C. * Freezing Temperatures must be avoided.
Size: Dial: 4.5”; Case: 16” H x 14” W x 8-3/4” D (406.4 mm H x 355.6 mm W x 222.25 mm D).
Weight: Gage: 3.6 lbs (1.6 kg); Gage & Case combined: 11.6 lbs (5.2 kg).

REDUCED PRESSURE PRINCIPLE ASSEMBLIES TEST PROCEDURES

TEST NO. 1
DOES THE DIFFERENTIAL PRESSURE RELIEF VALVE OPERATE TO MAINTAIN THE "ZONE" BETWEEN THE TWO CHECK VALVES AT LEAST 2 PSI LESS THAN THE SUPPLY PRESSURE?

1. Open test cock 4 to establish flow through the RP. Flush test cocks in the following order taking care not to dump the relief valve. Open and close test cock 1. SLOWLY open and close test cock 2. Open and close test cock 3. Close test cock 4. Install appropriate adapters in all test cocks.
2. Connect the red hose between test cock 2 and the high side (back, middle) connection on the test kit.
3. Connect the green hose between test cock 3 and the low side (back, right) connection on the test kit.
4. Slowly open test cock 3. Bleed the low side by opening the bleed low (top, right) valve.
5. Slowly open test cock 2. Bleed the high side by opening the bleed high (top, left) valve. Close the bleed high (top, left) valve.
6. After the gage reaches the upper part of the scale, close the bleed low (top, right) valve.
7. Close the No. 2 shutoff valve and observe the pressure drop across check valve 1. Should the pressure drop until the relief valve discharges continuously, check valve 1 is leaking and must be repaired before continuing.
8. Open the high (bottom, middle, red) valve.
9. Open the low (bottom, right, green) valve no more than one quarter (1/4) turn.
10. Watch the gage drop slowly to the relief valve opening point—record the reading. (If the differential pressure does not drop to the relief valve opening point, close the high and low valves and go to step 12.)
11. Close the high and low valves and go to Test No. 2.
12. No. 2 shutoff valve may be leaking. Re-open and close No. 2 shutoff valve to attempt a better shutoff. Repeat steps 7 through 10. If the relief valve does not open, a by-pass hose is required. (Large leaks may require a garden hose.)
14. Connect the hose from test cock 1 to test cock 4.
15. Open test cock 1 to pressurize the hose.
16. Slowly open test cock 4. Repeat steps 8 through 10. If the relief valve does not open, the leaky No. 2 shutoff valve must be repaired.

**TEST NO. 2**

**IS CHECK VALVE 2 PRESSURE TIGHT AGAINST BACK PRESSURE?**

**NO BYPASS HOSE USED IN TEST 1.**
1. Connect the black hose to the bypass (back, left) connection on the test kit.
2. Bleed bypass hose by opening the high (bottom, middle, red) and bypass (bottom, left, black) valves. Close the bypass valve.
3. Attach the bypass hose to test cock 4.
5. Open the bleed low (top, right) valve allowing the gage to reach the upper part of the scale. Close the bleed low valve.
6. Open the bypass (bottom, left, black) valve. 
   - If the differential pressure stabilizes above the relief valve opening point, check valve 2 is recorded as “tight”. (Proceed to Test No. 3.)
   - If the reading falls to the relief valve opening point, open the bleed low valve until the reading rises above the apparent No. 1 check valve pressure drop. Close the bleed low valve.
   - If the reading stabilizes above the relief valve opening point, check valve 2 is recorded as “tight” (proceed to Test No. 3).
   - If the reading falls to the relief valve opening point again, check valve 2 is noted as leaking and test No. 3 cannot be completed.

**BYPASS HOSE USED IN TEST 1**
1. Leave the bypass hose connected between test cocks 1 and 4.
2. Leave test cocks 1 and 4 open.
3. Open the bleed low (top, right) valve allowing the gage to reach the upper part of the scale. Close the bleed low valve.
4. If the differential pressure stabilizes above the relief valve opening point, check valve 2 is recorded as “tight”. (Proceed to Test No. 3.) If the reading rises above the apparent No. 1 check valve pressure drop. Close the bleed low valve.
   - If the reading stabilizes above the relief valve opening point, check valve 2 is recorded as “tight” (proceed to Test No. 3).
   - If the reading falls to the relief valve opening point again, check valve 2 is noted as leaking and test No. 3 cannot be completed.

**TEST NO. 3**

**IS THE STATIC PRESSURE DROP ACROSS CHECK VALVE 1 MAINTAINED AT LEAST 3 PSI ABOVE THE RELIEF VALVE OPENING POINT?**

1. Open the bleed low (top, right) valve allowing the gage to reach full scale. Close the bleed low valve.
2. Allow the gage reading to stabilize. Record this reading as the static pressure drops across check valve 1.
3. Close all test cocks. Open the No. 2 shutoff valve. Remove all test equipment. Drain test kit.

**DOUBLE CHECK VALVE ASSEMBLY TEST PROCEDURE**

**TEST SETUP:**
1. Obtain permission to shut off the water supply.
2. Determine the direction of flow.
3. Identify and "blow out" all 4 test cocks and install appropriate adapters in test cocks 2, 3 and 4.
4. All test kit valves are closed.

**IMPORTANT: THE TEST KIT AND HOSES MUST BE HELD AT PROPER LEVEL.**

Note: The bleed valve assembly and vertical tube assembly are not included with the Test Kit.

**TEST NO. 1**

**DETERMINE THE STATIC PRESSURE DROP ACROSS CHECK VALVE #1. REQUIREMENT: #1 CHECK VALVE PRESSURE DROP SHOULD BE AT LEAST 1.0 PSID.**

1. Install a vertical tube to test cock 3 that rises above the check valve body unless test cock 3 is the highest point of the check valve body.
2. Attach a bleed valve assembly to test cock 2 and the high hose of test kit to bleed valve assembly.
3. Open test cock 2 and bleed test kit by opening high side bleed valve. (High and by-pass valves on a 3-valve test kit). Close high side bleed valve. (High valve on a 3-valve test kit).
4. Open test cock 3 to fill the vertical tube or test cock, then close test cock 3.
5. Close #2 shut off valve, then close #1 shutoff valve.
6. With the test kit and hoses at the same height as the water in the tube or test cock 3, slowly open test cock 3.
   - a. Water stops running - record #1 check valve pressure drop, proceed to step 8.
   - b. Water continues to flow from test cock 3- proceed to step 7.
   - c. Water recedes from test cock 3- lower the test kit to the center line of the assembly and record #1 check valve pressure drop. Record #2 check valve and #2 shutoff valve as leaking.
7. Observe the test kit reading, then slowly open the bleed valve assembly:
   - a. If the bleed valve assembly can be adjusted so there is a slight drip from test cock 3 and flow from the bleed valve assembly, then record the test kit reading as the #1 check valve pressure drop. Proceed to step 8.
   - b. If the bleed valve assembly cannot be adjusted to allow a slight drip from test cock 3, then the leaky #1 shutoff valve must be repaired before the test may be completed.
   - c. If water does not continue to flow from the bleed valve assembly with water still flowing from test cock 3, record the test kit reading as the #1 check valve pressure drop. Record #2 check valve as leaking and #2 shutoff valve leaking under backpressure.
8. Close all test cocks, open #1 shutoff valve, and remove all test equipment.

**TEST NO. 2**

**DETERMINE THE STATIC PRESSURE DROP ACROSS CHECK VALVE #2. REQUIREMENT: #2 CHECK VALVE PRESSURE DROP SHOULD BE AT LEAST 1.0 PSID.**

9. Install a vertical tube to test cock 4 that rises above the check valve body unless test cock 4 is the highest point of the check valve body.
10. Attach bleed valve assembly to test cock 3 and high hose of test kit to bleed valve assembly.
11. Open test cock 3 and bleed test kit by opening high side bleed valve (high valve on a 3-valve test kit). Close high side bleed valve (high valve on a 3-valve test kit).
12. Open test cock 4 to fill the vertical tube or test cock, then close test cock 4.
TEST NO. 2

DOES THE CHECK VALVE SEAL IN THE DIRECTION OF FLOW WHEN THE INLET PRESSURE IS 1 PSI ABOVE ATMOSPHERIC PRESSURE?

PRESSURE TIGHT NO. 1 SHUTOFF VALVE
2. Bleed the high side by opening the bleed high valve (high valve on a 3-valve test kit). Close the bleed high valve (high valve on a 3-valve test kit).
3. Close shutoff valve No. 1, then open test cock 2.
4. Record the gage reading when water stops draining from test cock 2. It should be 1 PSI or higher.

LEAKY NO. 1 SHUTOFF VALVE
1. Connect a bleed-off valve assembly to test cock 1.
2. Connect high side hose to the bleed-off valve. Open test cock 1.
3. Bleed the high side by opening the bleed high valve (high valve on a 3-valve test kit). Close the bleed high valve (high valve on a 3-valve test kit).
4. Close shutoff valve No. 1, then open test cock 2.
5. Slowly open the bleed-off valve at test cock 1 until the water flow stops draining from test cock 2. Record the gage reading. It should be 1 PSI or higher. If the flow from test cock 2 cannot be stopped by opening the bleed-off valve, shutoff valve 1 must be repaired or replaced.

SPILL-RESISTANT PVB ASSEMBLIES TEST PROCEDURE

TEST SET UP:
1. Obtain permission to shut off the water supply.
2. Determine the direction of flow.
3. "Blow out" test cocks and vent valve and install appropriate adapter.
4. All test kit valves are closed.

IMPORTANT: THE TEST KIT AND HOSE MUST BE HELD AT THE SAME LEVEL AS THE PVB DURING TESTS 1 AND 2.

TEST NO. 1

DOES THE AIR INLET VALVE OPEN WHEN THE PRESSURE IN THE BODY IS AT LEAST 1 PSI ABOVE ATMOSPHERIC PRESSURE? IS THE AIR INLET VALVE FULLY OPEN WHEN WATER DRAINS FROM THE BODY?

1. Remove air inlet valve canopy.
2. Connect a hose between test cock 2 and the high side connection on the test kit. Open test cock 2.
3. Bleed the high side by opening bleed high valve (high and bypass valves on a 3-valve test kit). Close the bleed high valve (high valve on a 3-valve test kit).
4. Close No. 2 shutoff valve, and then close No. 1 shutoff valve.
5. Slowly open the bleed high valve (high valve on a 3-valve test kit) no more than 1/4 turn, dropping the pressure slowly. Record pressure reading when the air inlet valve opens. It should be 1 PSI or higher. If the air inlet valve does not open, go to step 8.
6. Fully open the bleed high valve (high valve on a 3-valve test kit). Check if the air inlet valve is fully open. Close the bleed high valve (high valve on a 3-valve test kit).
7. Close test cock 2. Disconnect the high hose from test cock 2.
8. Open shutoff valve No. 1. Proceed to Test No. 2.
9. Slowly open the bleed valve on the SVB (if gage reading drops, record the reading if the air inlet valve opens.)
7. Slowly open the bleed high valve (high valve on a 3-valve test kit) no more than 1/4 turn, dropping the pressure slowly. Record the pressure reading when the air inlet valve opens. It should be 1 PSI or higher. If the inlet valve does not open, close the bleed high valve (high valve on a 3-valve test kit) and go to step 10.

8. Fully open the bleed high valve (high valve on a 3-valve test kit). Check if the air inlet valve is fully open. Close the bleed high valve (high valve on a 3-valve test kit).

9. Close the vent valve on the SVB. Slowly open No. 1 shutoff valve.

10. The No. 1 shutoff valve is leaking. Open and close shutoff valve No. 1 to attempt a better seal. Repeat step 7. If step 7 cannot be passed, go to step 11.

11. Slowly open the bleed-off valve dropping the gage reading to about 10 PSI. Repeat step 7. If step 7 cannot be passed when the bleed-off valve is fully open, the No. 1 shutoff valve must be repaired or replaced.

**TEST NO. 2**

**IS THE STATIC PRESSURE DROP ACROSS THE CHECK VALVE 1 PSI OR HIGHER?**

1. Close No.1 shutoff valve. (If No. 1 shutoff valve was leaking in Test No. 1, go to step 3.)
2. Open the vent valve on the SVB. Record the gage reading when water stops draining from the vent valve. It should be 1 PSI or higher. Go to step 4.
3. Open the vent valve on the SVB. Slowly open the bleed-off valve until the water stops draining from the vent valve. Record the gage reading. It should be 1 PSI or higher.
   - If opening the bleed-off valve cannot stop the flow from the vent valve, the No.1 shutoff valve must be repaired or replaced.

**2 HOSE DOUBLE CHECK VALVE ASSEMBLY TEST PROCEDURE**

**TEST SET UP:**
1. Obtain permission to shut off the water supply.
2. Determine the direction of flow.
3. Identify and install appropriate adapters in all 4 test cocks. "Blow out" all 4 test cocks.
4. All test kit valves are closed.

**TEST NO. 1**

**IS SHUTOFF VALVE NO. 2 PRESSURE TIGHT?**

1. Connect the red hose between test cock 2 and the high side connection on the test kit.
2. Connect the green hose between test cock 3 and the low side connection on the test kit.
3. Open test cocks 2 and 3.
4. Bleed the high side of the test kit.
5. Bleed the low side of the test kit.
6. Connect the black hose between test cock 4 and the bypass connection on the test kit. Open test cock 4.
7. Close the No. 2 shutoff valve.
8. The gage should read a minimum of 1 PSID.
9. Open the high control and bypass valves.
11. If the gage reading drops to zero, shutoff valve No. 2 is leaking downstream.
   - If the gage reading increases, shutoff valve No. 2 is leaking under back pressure.
12. The check valves cannot be tested with this procedure unless a no-flow condition can be achieved through repair of shutoff valve No. 2 or additional downstream shut-off.

**TEST NO. 2**

**IS THE STATIC PRESSURE DROP ACROSS CHECK VALVE 1 AT LEAST 1 PSI?**

1. Close the high control and bypass valves.
3. Disconnect the bypass black hose from test cock 4 and the test kit.
4. Open test cock 2.
5. Bleed the high side of the test kit.
6. Bleed the low side of the test kit.
7. Record the gage reading. It should be 1 PSI or higher.
8. Close test cocks 2 and 3.
9. Disconnect hoses from test cocks.

**TEST NO. 3**

**IS THE STATIC PRESSURE DROP ACROSS CHECK VALVE 2 AT LEAST 1 PSI?**

1. Connect high (red) hose to test cock 3.
2. Connect low (green) hose to test cock 4.
3. Open test cocks 3 and 4.
4. Bleed the high side of the test kit.
5. Bleed the low side of the test kit.
6. Record the gage reading. It should be 1 PSI or higher.

**MAINTENANCE**

Upon final installation of the Series BTK Backflow Prevention Test Kit, no routine maintenance is required. A periodic check of system calibration is recommended. The Series BTK is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

©Copyright 2007 Dwyer Instruments, Inc. Printed in U.S.A. 9/07 FR# R1-443593-00

Dwyer Instruments, Inc.
P.O. Box 373 • Michigan City, Indiana 46361, U.S.A.
Phone: 219/879-8000 www.dwyer-inst.com
Fax: 219/872-9057 e-mail: info@dwyer-inst.com