In this issue of Think Safety we discuss pressure and leak tests. These tests are often confused both in terminology and in practice. Both tests are required to be completed before the installer leaves the premises or at least before the system is put into service. A pressure test is required for all new piping installations or new piping additions, while a leak test is required whenever a new gas installation is placed into service or before a system can be reactivated following a service interruption.

These tests are critical to the safety and well being of your propane customers. The lack of a leak test may not have been documented as the cause of fires, but certainly in many cases an undetected and unrepaired leak led to a fire or worse yet—an explosion.

Remember, if a properly done leak test is not documented, as far as the court is concerned, it was never done. Always make sure that your work is thoroughly documented. The strength of this document may not prevent a lawsuit, but it certainly is great ammunition for your defense.

The 2009 edition of NFPA 54 included some changes to leak testing language. You can find an article in the May issue of WVPGA’s Propane Exchange that includes references to those changes and a legal opinion as to what they might mean to the propane industry. The article is written by John V. McCoy, the president of McCoy & Hofbauer, S.C. He specializes in the representation of propane companies.

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Articles in this publication are for information only. Nothing in this publication is to be construed as setting standards or requirements. Please consult with appropriate regulatory and rulemaking bodies for all legal requirements.
Pressure Testing A Propane System:

Step 1: Prepare for the test.
All new gas piping systems must be inspected and pressure tested before they are put into operation to determine if the system complies with code.
The system should also be pressure tested following repairs that require replacement of piping or additions, unless they are minor in nature, the work is inspected and all materials meet proper approval. The piping can be tested as a complete unit or in sections.
The test medium must be air or an inert gas. Propane shall not be used. Oxygen shall never be used.
Pipe joints shall be exposed. Check the operating pressures of the appliances. Appliances with operating pressures less than the test pressure should be disconnected and the line capped.

Step 2: Apply pressure.
The test pressure should be measured with a pressure-measuring device such as a pressure gauge that will record a leak in the system with a loss of pressure.
A pressure of no less than 1 ½ times the maximum operating pressure with a minimum test pressure of 3 psig. This is a 10 minute test for a single family dwelling. If the calculated test pressure would exceed 125 psi, then the test pressure should not exceed an amount greater than 50 percent of the pipe strength.
The test period should be not less than ½ hour for each 500 ft³ of piping.

Step 3: Determine a pressure leak.
A drop in the pressure indicates a leak in the system. The leak should be located using an approved leak detector or by using leak detection fluid. Once the leak is located, the section should be repaired and the system tested again.

Leak Testing A Propane System (Low Pressure):

The 2006 version of NFPA-54 lists three types of leak testing. The following is based on the prescribed methods.
Unlike a pressure test, propane can be used during the performance of a leak test.

Step 1: Prepare for the test.
First, inspect all appliance valves and pipe connections to make sure they are wrench tight. All appliance shutoff valves must be turned on to test the 100 percent pilot shutoff. Turn off any appliance that does not have a 100 percent pilot shutoff (ie old style gas ranges with standing pilot).
Note: The test can be performed on either the high or low pressure portion of the system. The procedure differs Continued to Next Page
Leak Testing A Propane System (Low Pressure):

between the two.

First Test (Low Pressure)
Step 2:
Make connection.
Insert a gauge or manometer into the downstream side of the final stage regulator.

Step 3:
Pressurize the system.
Open the tank valve to pressurize the system. Leave it open for a period of two or three seconds, then close it tightly.
Step 4: Check for leak. Bleed down to 9” plus-or-minus 1/2” and test for three minutes.
If the system holds pressure for three minutes without falling, it is considered a leak-tight system. However, a drop in pressure indicates a leak somewhere in the high or low pressure piping.

Remove the pressure tap from the second stage or integral two-stage regulator. This is where you will connect the low pressure testing instrument. The photos show the use of a magnehelic gauge.

Repressurize the system.
Drop the pressure to 9” +/- 1/2 inches water column to make sure all regulators are unlocked.
Test the system for three minutes without an increase or decrease in pressure.
Record your results.
Leak Testing A Propane System (High Pressure):

**Step 2: Make connection.**
Attach a high pressure (300-pound) gauge between the container valve and the first stage regulator.

**Step 3: Pressurize the system.** Open the container valve to pressurize the system. Leave it open for a period of two or three seconds, then close it tightly.

**Step 4: Check for leak.**
Bleed down the system by at least 10 pounds. Test for three minutes. Observe the reading on the gauge. If the gauge reading remains constant, it can be assumed the system is leak tight. If the pressure drops, it indicates a leak somewhere in the high or low-pressure piping.

**Third Option:**

**Step 2: Make connection.**
Install a 30-pound gauge into the outlet of the first stage regulator.

**Step 3: Pressurize the system.** Open the container valve to pressurize the system. Leave it open for a period of two or three seconds.

**Step 4: Check for leak.**
Close the service valve tightly. Bleed down the system by at least five pounds. Test for three minutes. Observe the reading on the gauge. If the pressure drops, it indicates a leak somewhere in the high or low-pressure piping.

**A Leak Is Indicated:**

If a leak is indicated through any of these tests, check the joints and other possible leak points with an approved leak detector such as a gas detector or liquid leak detector. Soapy water will work, but it should be rinsed from the piping due to its corrosive nature. *Never test with an open flame. “Safety matches” should never at any time be used.*

If the pressure increases, the tank valve is not shut completely off. Shut off the tank valve and repeat the test. If pressure continues to build, it may indicate a weepy service valve. The valve should be changed.

It is a good idea when recording the test to use the exact time and pressure from the test. Most people will record the pressure test as 15 lbs 10 minutes every time. That could indicate to a third party that the test was not performed.

For example a proper pressure test format might look like this:

- **Start time:** 9:32 am 18lbs or whatever is on the gauge
- **Stop time:** 9:45 am (or the exact time held) 18lbs or whatever is on the gauge.

This format would likely be more convincing in the event an insurance company, government official, or an attorney should ever view it.
Training Quiz

Name__________________________________  Social Security Number_________________________

1. When is a pressure test required?
   A. Beginning of service  B. New piping installations  C. Addition of Appliance.  D. A,B, and C

2. When is a leak test required?
   A. Beginning of service B. Out-of-gas C. Any service interruption. D. A,B, and C

3. It is okay to use propane to perform a pressure test.
   A. True B. False

4. It is okay to use propane to perform a leak test.
   A. True B. False

5. A propane system can be pressure tested as a complete unit or in sections.
   A. True B. False

6. The test medium for a pressure test must be ___ or an ___ gas.
   A. air, inert  B. air, propane  C. propane, inert  D. propane, butane

7. Oxygen can be used to perform a pressure test.
   A. True B. False

8. Pipe joints shall be exposed during a pressure test.
   A. True B. False

9. A pressure of no less than ______ times the maximum working pressure should be used to perform the pressure test with a minimum of ___ psig.
   A. 2, 3  B. 3, 4  C. 1 and 1/2, 3  D. 5, 3

10. The pressure test should be of at least __ minutes in duration for a single family dwelling.
    A. 3  B. 10  C. 5  D. 15

11. The exact duration and the pressure of the test should be documented not a predetermined duration and pressure.
    A. True B. False

12. When performing a low pressure leak test, you should bleed the system down to ___ inches water column plus-or-minus ___ inch.
    A. 5, 3/4  B. 10, 1/2  C. 5, 1/2  D. 9, 1/2

13. If the system holds pressure for a minimum of __ minutes during a leak test, it is considered a leak-tight system.
    A. 3  B. 5  C. 7  D. 10

14. If the pressure continues to increase after the tank is turned off it indicates a leaky service valve.
    A. True B. False
Training Quiz Answers

Name_________________________ Social Security Number_________________________

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   A. Beginning of service  B. New piping installations  C. Addition of appliance  D. A, B, and C

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