

**FINGER LAKES LIVE STEAMERS INC.
BOILER SAFETY AND INSPECTION CHECK**

REV D 6-3-2011

Alan E. Francis on behalf of the Finger Lakes Live Steamers Inc.

All boilers shall be hydrostaticly tested (**Part 1: Hydrostatic Test**) to a pressure of **150%** of **Maximum Operating Pressure**, hot tested (**Part 2: Hot Test**) and then **Recorded**. If the boiler passes all tests an **Owners Record** will be issued. This test must take place within the 12 months prior to operating under power. (Firing by any means)

All boilers shall be equipped as follows.

- 1- One (1) or more safety valves with sufficient combined capacity to limit the pressure in the boiler to or below the **Maximum Operating Pressure** plus 5% when under power.
- 2- Two (2) or more fully functional devices (**pumps, injectors, etc.**) to add water to the boiler while under pressure and that will maintain the required water level when under power.
- 3- A functional **Sight Glass** which indicates water level in the boiler.
- 4- A functioning **pressure gauge** with a range of at least 150% of the **Maximum Operating Pressure**.
Example. If the **Maximum Operating Pressure** is 100 PSIG, the gauge should read up to at least 150 PSIG.

Everyone shall use this **BOILER SAFETY AND INSPECTION CHECK** procedure. Visitors may submit a current home state or home club **BOILER SAFETY AND INSPECTION CHECK** in lieu of this test. All tests of a similar nature will be accepted. All tests must have been preformed and documented in less than the 12 preceding months.

Locomotive Owner _____
Locomotive Number _____ Locomotive Class _____
Test Date ____ - ____ - ____ Expiration Date ____ - ____ - ____
Operating Pressure _____ PSIG Test Pressure _____ PSIG

The **Owner** or his designated representative shall perform the test.

A **Credible Witness** shall certify that this test has been performed as set forth in **Part 1** and **Part 2** of this document. The **Witness** will initial each step as the test is done. At the end of a successful test the witness will complete the **Owners Record** and give it to the owner. This completed record should be permanently retained by the owner.

Witness Name (print) _____ Initials _____

The **owner** shall provide all of the materials for this test. These materials shall include the safety valve or valves to be used on the boiler, the test pressure gauge including adapters, a hand pump or other device to pressurize the boiler, plugs and fittings as may be required to plug openings in the boiler and all tools.

THE TEST

PART 1: HYDROSTATIC TEST

____ 1- The boiler shall be completely filled with water and all the air bled out. Water will continue to be pumped into the boiler until the safety valve with the lowest setting opens. Record the pressure below. The safety valve will then be removed and the opening plugged. Adjust the valve if required and repeat until it has been shown that the safety valve opens at the **Operating Pressure** or if equipped with more than (1) one safety valve that the rest open no higher than **5%** above the **Operating Pressure**.

Calculation. **(Operating Pressure) X (1.05) = 5% above operating pressure**

Example. 125 PSIG X 1.05 = 131.25 rounded up to 132

Record the number of safety valves the boiler is equipped with. _____

Record the opening pressure for valve 1 _____ PISG

Record the opening pressure for valve 2 _____ PISG

Record the opening pressure for valve 3 _____ PISG

Record the opening pressure for valve 4 _____ PISG

____ 2- Remove all safety valves and plug all the openings except one. Install the **test gauge** in that opening. Piping into the boiler not being used to introduce water under pressure should be shut off if possible. Using the hand pump, pump the boiler to **150 %** of the **operating pressure**. Maintain this test pressure for at least one (1) minute, pumping to compensate for **weeps** at plugs, fittings, rolled or expanded tubes, etc. (These weeps are permissible).

Note: At this time the **Owner** should compare (**Accuracy**) the readings of the **Test Gauge** to the reading on the **boilers pressure gauge**. **Caution!!!** This should be done up to and only slightly beyond (approximately 20 PSIG) the **operating pressure** to avoid damaging the boilers pressure gauge. After comparison the **boilers pressure gauge** must be shut off or disconnected and the opening plugged.

____ 3- While the boiler is pressurized to **150 % of the operating pressure** inspect inside the smokebox, inside the firebox, and all exposed surfaces of the boiler, including stays, welded, silver soldered or bolted joints, and boiler fittings for **leaks, weeps** or **distortion**.

A- The boiler shall be rejected for **leaks** or **weeps** at welded or silver soldered joints.

B- The boiler shall be rejected for **leaks** or **weeps** thru plates and thru tubes

C- The boiler shall be rejected for **leaks, weeps** or **distortion** in the shell of the boiler.

D- The boiler shall be rejected for the **distortion** of plates or surfaces.

Note: Minor **weeps** at rolled or expanded tubes, threaded or bolted joints, fittings such as check valves and sight glasses, and valve packing glands **shall not** be grounds for rejecting the boiler.

PART 2:

HOT TEST

_____ 1- While firing the boiler, check that the water sight glass indicates changes in the water level.

_____ 2- While bringing the boiler up to operating pressure, blow down the water sight glass, if it is equipped with a blow down, and recheck its operation. Check that each means of putting water in the boiler, except an axle pump, is working, and that it is possible to maintain the water level in the boiler.

_____ 3- Using the draft inducing blower and or by over firing, bring the boiler up to operating pressure and beyond, and demonstrate that the safety valve or valves have enough capacity to prevent the pressure from continuing to increase above **105%** of the **operating pressure**. **This is the Accumulation Test.**

Record the opening pressure of each of the safety valves during the test.

Record the opening pressure for valve 1 _____ PISG

Record the opening pressure for valve 2 _____ PISG

Record the opening pressure for valve 3 _____ PISG

Record the opening pressure for valve 4 _____ PISG

If the pressure can not be controlled by the safety valves to **105% or less**, it is grounds for rejection.

_____ 4- After leaving the steaming bays. Check the operation of the axle pump if the locomotive is so equipped.

Note: Before leaving the steaming bay, it is wise to check that the whistle or other signaling device is operational and check to see if the locomotive brakes if so equipped are operational. It is recommended that the operator of the boiler hot test the locomotive at the beginning of each operating session.

ACCEPTANCE, REJECTION, RECORDING AND RECORD RETENTION

REJECTION

If **Rejected**, indicate so by the witness initialing this line _____. Write in the location and reason for the rejection. _____

If rejected the test is over and the boiler cannot be operated until it is repaired and an entire successful test is completed.

ACCEPTANCE AND RECORD RETENTION

Upon successful completion of **Part 1 (The Hydrostatic Test)** and **Part 2 (The Hot Test)**, the witness shall fill out the owners **Boiler Safety and Inspection** record. This is to be kept by the owner. The witness shall then sign and date below indicating he witnessed a successfully completed test. This document regardless of outcome shall be kept in a permanent record at the **FINGER LAKES LIVE STEAMERS INC.** site.

WITNESS SIGNATURE _____ DATE _____

Notes & Definitions

- 1- Operating Pressure or Maximum Operating Pressure**, is the pressure designed for operation and to which the pressure safety valve with the lowest setting is set.
- 2-Maximum Working Pressure**, is the pressure used by the designer of the boiler to determine the thickness of plates, size and spacing of stay bolts and other features of the boiler. The designer of the boiler should be able to supply this number to you. You can back into this number using the methods given in the State of Maryland boiler test.
- 3-Test Pressure**, is the operating pressure multiplied times 1.5
- 4-Test Gauge**, is a pressure gauge of known accuracy used in the hydrostatic test, and to compare to the boiler pressure gauge.
- 5-Boiler Pressure Gauge**, is the pressure gauge attached to the boiler and used in the normal operation of the boiler.
- 6-Note:** It is wise to check the **Accuracy** (calibration) of pressure gauges from time to time especially if they are old, or homemade. It is usually sufficient in the field to check one pressure gauge against a second known gauge. Errors tend to be random, while accurate gauges will read the same, within 2 to 3 %. Differences indicate that one or the other of the gauges is in error and **both** should be tested further.
- 7-Note:** This test is for boilers having a **volume of less than two cubic feet and a grate area not in excess of two square feet.**
- 8-Weeps.** A weep is when a small droplet of water forms at a point, but does not flow.
- 9-Leaks.** A leak is when water flows from a point.
- 10-Owner.** A person that possesses or is ultimately responsible for a boiler.
- 11-Distortion.** Is when a surface changes in shape by pressure or mechanical means.
- 12- Credible Witness.** A person who is a **regular member** of the **FINGER LAKES LIVE STEAMERS INC.**, and understands the entire test and document.
- 13- Accumulation Test**, is a test to show that the safety valve or valves are able to control the **Maximum Pressure** generated under forced firing to **105%** or less of the **operating pressure**.
- 14-Rejected** Means an unacceptable condition or unacceptable feature has been found, documented and the boiler can not be operated under any conditions at the **FINGER LAKES LIVE STEAMERS INC.** site.
- 15- Expiration Date** Is 12 months minus 1 day from the Test Date.