

## NWSS Annual Safety Check Guide – latest revision 8-20-23

This is a guide intended to help our steamboat owners and Safety Committee Members accomplish the NWSS owner's annual boiler safety check. It is available online for downloading from the "safety" page of our website: <https://www.northweststeamsociety.org/safety>

**Purpose:** The purpose of the boiler safety check of NWSS Members' boats is to ensure that the boiler(s) do not have any cracks, fractures, or other defects which could cause a boiler failure, exposing operating personnel and/or bystanders to possible injury. To this end a non-destructive hydrostatic test at 1.5 times the safety valve setting, a test of the boiler safety valve to ascertain relief pressure and volume; and verification of the correct working of the boiler water gage glass are required.

### **Vessel Owners, before you contact a Safety Committee Member Witness:**

Determine if you will need an external hand pump, a pressure gage with an increased range, or any fittings to conduct the tests. A second gage is recommended as a check on your main gage.

Do your hydro test – temperature of water for this test should be 60°F to 120°F:

- Close all valves connected to the boiler except the water gage glass valves and the pressure gage valve;
- Remove the safety valve but do not "cap" or "plug" the connection to allow for venting of air or excess water when filling the boiler for the test;
- Open the feedwater valve and fill the boiler with water, allowing air and excess water to overflow through the safety valve connection;
- Plug or cap the safety valve connection after all air has been discharged;
- Determine test pressure (1.5 times safety valve setting as in Purpose);
- Ensure boiler pressure gage has sufficient range (change if necessary);
- Pump up to test pressure with a hand pump (a hand pump allows the test pressure to easily be kept within the plus/minus 6% allowable pressure variance), closing the feedwater valve when completed;
- The pressure should not markedly decrease over a ten (10) minute time span. Typically, there will be some minor (not to exceed 6%) pressure loss due to valve leakage, or entrained air;
- Ensure pressure vessel is sound;
- Check boiler and fittings for leaks and fix as needed;
- Drain water to normal steaming level using the blowdown valve;
- Verify the boiler water gage glass is operating and free of obstructions – see "Verifying Water Gage Glass Accuracy" instructions below;
- Properly re-attach safety valve and discharge piping;
- Light fire;
- Verify safety valve operating pressure and ability to limit further pressure build up by raising steam pressure to safety valve relief pressure. Safety valve should open with a definite "pop", and remain open until pressure drops approximately 5% below set pressure, then the valve should close instantly without subsequent leakage. A tiny bit of initial leakage is permissible, if it ceases in a few seconds.

All Okay? Then schedule a meeting with a Safety Committee Member as the "Witness". A list of current Safety Committee Members may be found on the NWSS website on the "safety" page.

### **Safety Committee Witness:**

Determine a mutually agreeable time and place to “witness” the owner’s test.

Agree on the hydro pressure for the test with the owner.

Observe the owner testing (as noted above) and assist or advise as needed.

Upon successful completion:

- Completely fill out one Safety Certificate form;
- Owner and Witness sign the Safety Certificate form;
- Issue the completed Safety Certificate form to the Vessel Owner.

“Witness” is to promptly advise the NWSS Safety Committee Records Manager of the vessel name, owner name, witness name, date of the Safety Certificate issue, boiler type (fire or water tube), safety valve setting, relief pressure, hydro pressure, and water gage test.

Safety Certificates are required for steamboat participation in NWSS Sanctioned Meets and are valid for one year from the date of issue or until boiler is modified – whichever comes first.

### **Verifying Water Gage Glass Accuracy:**

Use the water glass to monitor the boiler water level at all times. Before firing up, check that the water gage is working properly:

- Open the whistle valve to equalize the pressure inside and outside of the boiler.
- Close the lower shut off valve. (Be sure to note the water level.)
- Open the drain. The gage glass should empty.
- Open the lower valve, water should rise in the glass and return to original level.

After getting up steam and prior to leaving the dock the water glass blowdown and inspection procedure must be conducted. This is achieved by conducting the following operations:

- Close both the upper and lower shut off valves (be sure to note the water level.)
- Open the drain.
- Open the lower shut off valve, water should issue from the drain forcefully and appear in the glass.
- Shut lower valve, water should cease to issue from the drain and should vacate the glass.
- Open the upper valve, steam should forcefully issue from the drain with no water in the glass.
- Close the upper valve, steam should cease to issue from the drain.
- Repeat the previous 4 steps if necessary.
- Close the drain valve.
- Open the upper valve, no water should be present in the glass.
- Open the lower valve, water should rise in the glass and return to original level.

While in service, the water glass should be blown down frequently. Water glasses have been known to give artificially high readings due to siphoning, thus it is your job to remain vigilant that the water is always maintained at a safe level above the low water level. At no time should the water ever be out of sight at either the upper or lower limit of the water glass in service. If the water falls out of sight in the glass, extinguish the fire immediately to prevent damage and injury to equipment and crew! **DO NOT** add water as the boiler may be overheated.