

PARKER BOILER CO.
ENERGY EVALUATION & SEMI-ANNUAL TUNE-UP PROCEDURES STEAM & HOT WATER BOILERS
ATMOSPHERICALLY FIRED

FACILITY

COMPANY/ADDRESS: _____ **BOILER MODEL NO.:** _____
 _____ **SERIAL NO.:** _____ **S.O. NO.:** _____
 _____ **PHONE:** _____
 _____ **CONTACT:** _____

EQUIPMENT REQUIRED:

- | | |
|------------------------------|--|
| 1. Combustion Analyzer | 4. Tube Inspection, Wrench, Plugs, Gaskets |
| 2. Gas Pressure Gauges | 5. Orifice Drills |
| 3. Draft Gauges or Manometer | 6. Barometric Damper Weights |

I. PRELIMINARY ANALYSIS (REVIEW WITH OWNER)

- ____ 1. **CHECK THE OPERATING PRESSURE OR TEMPERATURE.** Operate the boiler at the lowest pressure or temperature that will satisfy the load demand. This will minimize heat and radiation losses. Determine the pressure or temperature that will be used as a basis for comparative combustion analysis before and after tune-up.
- ____ 2. **CHECK OPERATING HOURS.** Plan the work load so that the boiler operates only the minimum hours and days necessary to perform the work required. Less operating hours will reduce fuel and other costs. For boilers subject to retrofit and Tune-Up Rules a fuel meter will be required to prove fuel consumption is less than the therms/year limit (for regulated areas).
- ____ 3. **CHECK INSULATION.** Check condition of (or absence of) appropriate insulation on all cabinet, steam pipes, return tank, heat exchangers, storage tanks, etc. Lack of insulation will significantly increase fuel usage.
- ____ 4. **CHECK AIR SUPPLY.** Sufficient fresh air supply is essential to insure optimum combustion and the area of openings must be in compliance with local codes. Air openings must be kept wide open and clear from restriction. Insure no Exhaust Fans in Boiler Room.
- ____ 5. **CHECK VENT.** Proper venting is essential to assure efficient combustion. Insufficient draft or over-draft promotes hazards and inefficient burning. Check to be sure that vent is in good condition, sized properly and with no obstructions.
- ____ 6. **CHECK BOILER AREA.** Check area for no combustibles around boiler & no chance of flammable vapors in boiler area.

COMMENTS: _____

____ 7. Perform an **AS IS** combustion analysis with a warmed up boiler at High and Low fire if possible. In addition to print out from Combustion Analyzer, also record:

A. Gas Pressure at burner: High fire ____ "W.C. Med fire ____ "W.C. Low fire ____ " W.C.
B. Draft below draft hood or barometric damper: High fire ____ "W.C. Med fire ____ "W.C. Low fire ____ " W.C.

Preferred values are:

- 1) Draft hood: less than (- .02" W.C.)
 2) Barometric Damper: (- .04 to - .06" W.C.) as a minimum.

C. Steam pressure or Water temperature in and out of boiler.

Steam pressure _____ psi Water temperature in _____ ° F Water temperature out _____ ° F

D. Check rate on boiler if meter is available: _____ MBTU/HR

COMMENTS:

With above conditions recorded make the following checks and corrective actions as necessary:

II. CHECKS & CORRECTIONS

____ 8. **CHECK FOR CLEAN BOILER TUBES & HEAT TRANSFER SURFACES.** Internal build-up of sediment and scale on the heating surfaces creates an insulating effect that quickly reduces efficiency. A 1/16" of scale will reduce efficiency and increase operating costs in excess of 14%. External build-up of soot and sediment will have a comparable effect. Excessive fuel cost will result if the boiler is not kept clean. Clean tube surfaces, remove scale and soot, assure proper boiler water flow and flue gas flow.

COMMENTS ON INTERNAL & EXTERNAL TUBE CONDITION: _____

- 9. **CHECK BOILER WATER TREATMENT & BLOWDOWN PROGRAM.** Soft water and the proper Boiler Water Treatment must be uniformly used to minimize scale and corrosion. Daily flushing and the proper blowdown must be employed to eliminate sediment and scale build-up on a steam boiler.

COMMENTS: _____

- 10. **CHECK FOR STEAM LEAKS.** Repair all leaks immediately as even small leaks at high pressure quickly add up to considerable fuel and water treatment losses. Be sure there are no leaks through the blow-off, drains, safety valve, by-pass lines and at the boiler feed pump.

COMMENTS: _____

- 11. **CHECK BURNER CONDITION.** Dirty burners or burner orifices will cause boiler efficiency and rate to decrease. Clean burners and burner orifices thoroughly. To clean burners effectively all burners must be removed, blown out with high pressure air and checked for obstructions, all accumulated sediment, dirt and carbon must be removed. Thru each burner orifice run a proper size drill thru the hole. Replace burners on orifices. Check for smooth lighting and even flame. Confirm proper gas pressure.

COMMENTS: _____

III. SAFETY CHECKS

- 12. Thoroughly check complete gas line for leaks, check all tubing, fittings, plugs etc. Repair all leaks.
- 13. Test primary and secondary low water controls.
- 14. Check operating and limit controls (Pressure, temperature, high and low gas and flue gas spillage).
Operating Control _____psi High Limit _____psi
- 15. On Steam Boilers check tubing to pressure controls to confirm clean tubes & accurate pressure readings. Check for no stoppage or buildup of material in pressure control diaphragms.
- 16. Check pilot safety shut off operation.
- 17. Check safety valve pressure and capacity to meet boiler requirements and trim pressure. Lift relief valve with Customer pre-approval and Customer pre-arrangement to pay for replacement if required, or insure that Customer will test relief valve on a monthly basis. It is important that the valve be re-seated properly.

IV. ADJUSTMENTS

While taking combustion readings with a warmed up boiler at high fire perform adjustments and analysis as follows:

- A. Adjust boiler to fire at rate. Normally 4"W.C., record pressure. _____" W.C.
- B. Adjust draft to obtain efficient clean combustion at both high, medium & low fire, use values given in Step 6 as a basis. CO value should always be below 400 PPM @ 3% O₂. If CO is high, increase draft by adding weights to barometric damper. This will lower CO and increase O₂. Normal O₂ levels will be between 5.5 - 7.5% at high fire and 8.5 - 12% at low fire. If CO is still present with preferred draft and proper high fire gas pressure, then lower gas pressure until CO is less than 400 PPM @ 3% O₂. (Check to ensure boiler light offs are smooth and safe at reduced gas pressure at both high and low fire.)
- C. Check and adjust operation of modulation controller. Insure proper efficient and clean combustion thru range of firing rates. (When above adjustments and corrections have been made record data.)

COMMENTS: _____

V. FINAL TEST

- 18. Perform a final combustion analysis with a warmed up boiler at high, medium & low fire if possible. In addition to print out from Combustion Analyzer, also record:

A. Gas Pressure at burner: High fire _____"W.C. Med fire _____"W.C. Low fire _____" W.C.

B. Draft below draft hood or barometric damper: High fire _____"W.C. Med fire _____"W.C. Low fire _____" W.C.

Preferred values are:

1) Draft hood: less than (- .02" W.C.)

2) Barometric Damper: (- .04 to - .06" W.C.) as a minimum.

- C. Steam pressure or Water temperature in and out of boiler.

Steam pressure _____psi Water temperature in _____°F Water temperature out _____°F

- D. Check rate on boiler if meter is available: _____MBTU/HR

(Attach printout from combustion analyzer to this report. Customer to retain copy also.)

COMMENTS: _____

TUNE-UP PERFORMED BY:

**PARKER BOILER CO.
5930 BANDINI BLVD.
LOS ANGELES, CA 90040
PH: (323) 727-9800**

DATE OF INITIAL VISIT: _____

DATE OF FINAL VISIT: _____

THE BOILER HAS BEEN CHECKED AND TUNED PER THE REQUIREMENTS OF THIS TUNE-UP PROCEDURE FOR ATMOSPHERIC BOILERS.

TECHNICIAN SIGNATURE: _____ **DATE** _____