

PARKER BOILER CO.
ENERGY EVALUATION/TUNE-UP PROCEDURES FOR PARKER STEAM & HOT WATER BOILERS
EQUIPPED WITH PARKER PREMIX METAL FIBER BURNER SYSTEM

FACILITY

COMPANY/ADDRESS:

BOILER MODEL NO.: _____

PHONE: _____

SERIAL NO.: _____

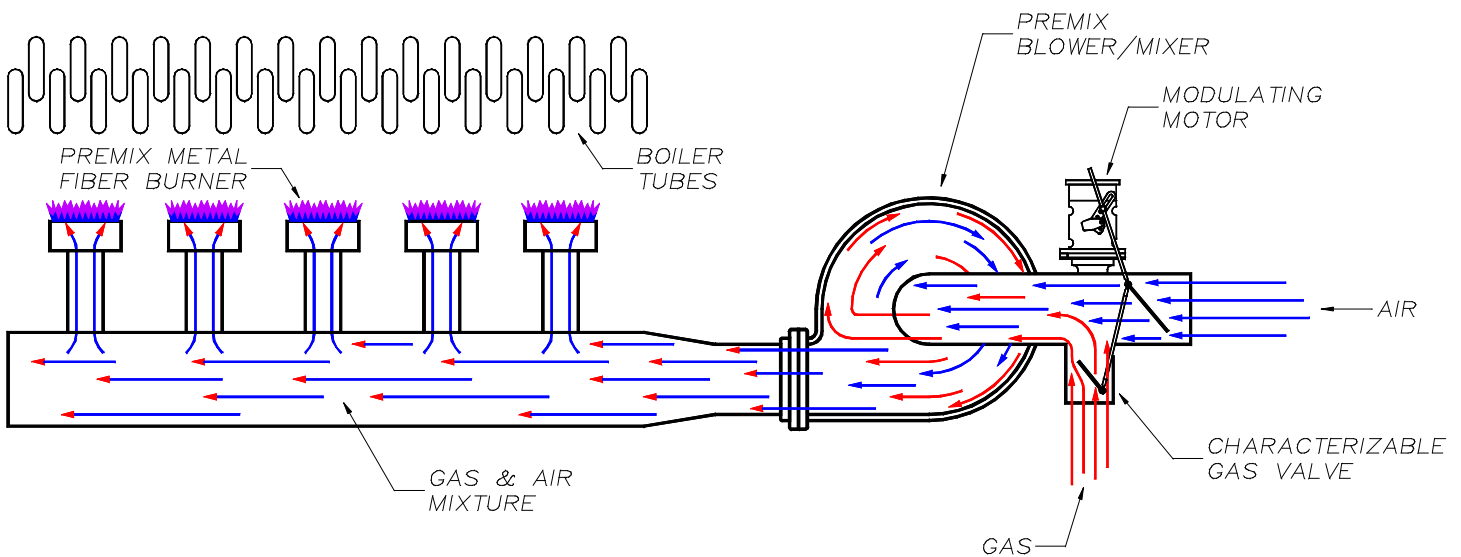
CONTACT: _____

MFB (METAL FIBER BURNER) GENERAL MAINTENANCE

The Parker Premix Metal Fiber Burner System should be checked and tuned by competent personnel normally on a yearly basis. Only trained and qualified personnel should install, start-up, operate, adjust, repair or maintain this boiler equipment. The Parker Premix Metal Fiber Burner System is an extremely durable ultra Low NOx High Efficiency Burner System incorporating a premixed blower mixer. This System offers very durable burners and outstanding repeatability from year to year in terms of gas/air ratios, and NOx emissions.

In some situations dirt, dust, debris, etc. may accumulate on the burner surface and have the effect of increasing the pressure drop through the burner surface slightly. These type of aberrations can be easily corrected by slight adjustments of the Maxon gas Butterfly positioner, and or burner cleaning.

The following procedure summarizes the recommended servicing, maintenance and tune-up procedures for Parker Premix Metal Fiber Burner Systems. Please note that it is quite important that large particles, dust, beads, etc. do not enter the Burner System as this could create blockage of the Premix Metal Fiber Distribution System. The frequency of maintenance required on the particular items on the Burner System is extremely dependent on environmental conditions. In dusty, corrosive, or salt atmospheres more maintenance/lubrication is required.



PARKER PREMIX BURNER SYSTEM
WITH METAL FIBER BURNERS

Please follow the instructions below for check-out and tuning.

EQUIPMENT REQUIRED:

- | | |
|---|--------------------------------|
| 1. Combustion Analyzer | 5. Barometric Damper Weights |
| 2. Gas Pressure Gauges | 6. Gas Line Soap Test Solution |
| 3. Draft Gauges or Manometer | 7. AMP meter |
| 4. Tube Inspection Wrench, Plugs, Gaskets | 8. Grease |

I. PRELIMINARY ANALYSIS (REVIEW WITH OWNER)

- A. CHECK THE OPERATING PRESSURE OR TEMPERATURE.** Operate the boiler at the lowest pressure or temperature that will satisfy the load demand not less than 130°F for hot water boilers. 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.
- B. 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.
- C. 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.
- D. 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. Air openings must comply with the Uniform Mechanical Code. Insure air supply is from safe source.
- E. 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.
- F. AS IS COMBUSTION.** Perform an AS IS combustion analysis with a warmed up boiler at High, Medium and Low fire if possible. Insure blower modulating circuit drives from hi to low properly. Close all doors and windows in boiler room, turn on any exhaust fans that may run at the same time as the boiler. In addition to print out from Combustion Analyzer, also record:
- | | | | |
|----------------------------------|-----------------------|----------------------|-----------------------|
| 1. Gas Pressure at blower inlet: | High fire _____ "W.C. | Med fire _____ "W.C. | Low fire _____ " W.C. |
| 2. Premix Manifold Press: | High fire _____ "W.C. | Med fire _____ "W.C. | Low fire _____ " W.C. |
| 3. Maxon Position: | High fire _____ | Med fire _____ | Low fire _____ |
| 4. Maxon Amps: | High fire _____ | Med fire _____ | Low fire _____ |
- (Check for proper rotation)
5. 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.
6. Steam pressure or Water temperature in and out of boiler.
Steam pressure _____ PSI Water temperature in _____ °F Water temperature out _____ °F
7. Check rate on boiler if meter is available: _____ MBTU/HR

COMMENTS: _____

With Item I, Section F conditions recorded make the following checks and corrective actions as necessary:

II. CHECKS & CORRECTIONS

 A. 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: _____

 B. 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: _____

 C. 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 or at the boiler feed pump.

COMMENTS _____

 D. CHECK METAL FIBER BURNER & PREMIX SYSTEM CONDITION

- 1. Remove boiler doors and observe normal light off sequence. Insure all burners light off smoothly and flame carryover is good.
- 2. Insure boiler drives to low fire for pilot ignition if appropriate for that model. NOTE: Not lower than 5-6 on Maxon (for boilers greater than 1,500,000 BTUs.) Most systems employ a purge period and the pilot trial for ignition occurs at low fire.
- 3. Insure purge time is correct.
- 4. Insure that all burners are straight and level. Insure that no holes, cracks or warps have developed on top or on sides of burner or on mating flanges. Insure the entire surface has even flame distribution, thru all firing rates.
- 5. Look for dirt or metal flakes on burner surface.
- 6. Burner surface dirt, dust, metal flakes, etc. should be cleaned off of burner surface. Use air or soft rag to dust burners off. Do not use wire brush. If burners are still dirty after above procedures, the burners can be removed and washed.
- 7. Check carryover tube condition and mounting. Insure carryover is proper from tube to tube.
- 8. Insure premix manifold and piping have no gas/air leaks and no damage or warpage has occurred.
- 9. Check all bolts and nuts from transition from pipe to MFB burners. Insure no deformations have occurred.
- 10. Repair all defective or questionable items.

COMMENTS ON BURNER CONDITION: _____

E. BLOWER MIXER CHECK

- _____ 1. Check rotation
- _____ 2. Check motor and casing bolts, tighten if required.
- _____ 3. Check impeller hold down Allen screws for tightness, insure impeller is firmly mounted to shaft.
- _____ 4. Insure impeller is centered in casing.
- _____ 5. Check for smooth rotation, no rubbing should occur.
- _____ 6. It should be insured that the Maxon Ratio Valve does not drive to a position of less than 5 at the low fire and light off positions. (Applicable for boilers greater than 1,500,000 BTU.) For low fire positions lower than this consult factory.
- _____ 7. It should also be insured that the Maxon Ratio Control Valve has stainless steel shafts installed. Please note that Parker Boilers shipped before 9/1/95 may be provided with a carbon steel shaft riding in the cast iron housing. This situation may create corrosion and shaft binding. Maxon's solution to the problem has been to change this shaft to a slightly smaller diameter stainless steel shaft with O-rings to retain grease and a groove recessment in the shaft to also retain grease at the point where lubrication is required. It should be insured on jobs where tune-ups are accomplished that shafts have been changed to stainless steel and lubricated. It is critical that both the gas and the air shaft be changed and lubricated so it is insured that neither the gas or air shaft will bind.
- _____ 8. Lubrication: The gas and air shafts should be lubricated either yearly or more often to insure continued smooth operation. In corrosive atmospheres i.e. near the ocean, lubrication should occur more frequently. Maxon shaft assembly should be disassembled to allow shaft removal, see Maxon literature. Sand or buff shaft smooth as required, grease and reassemble. Insure positioning of shaft upon reassembling is identical to previous positioning. (Note: Allen screw countersinks on air shaft).
- _____ 9. As part of the check out process for the Maxon Ratio Valve it is recommended that when the quadrant is removed the gas shaft be compressed all the way and it should be insured that the spring return on the gas shaft is working properly and that this shaft will not bind at the high fire position.
- _____ 10. Check that blower mixer drives from hi to low properly and does not attempt to overdrive stops.
- _____ 11. Check linkage and Maxon cam for tightness.
- _____ 12. Check amps on Maxon blower mixer. Record with combustion readings.

COMMENTS: _____

F. SAFETY CHECKS

- _____ 1. Check gas line for leaks.
- _____ 2. Check boiler vent.
- _____ 3. Insure combustion air is from safe clean source and per Code.
- _____ 4. On Steam Boilers Check tubing to pressure controls to confirm clean tubes and accurate pressure readings.
- _____ 5. Test primary and secondary low water controls.
- _____ 6. Check operating, modulating and limit controls (Pressure, temperature, high and low gas and flue gas spillage).
 Operating Control _____ PSI High Limit _____ PSI
- _____ 7. Check pilot safety shut off operation.
- _____ 8. Check fan air switch.
- _____ 9. Check electrical starter interlock to insure burner shuts off with loss of power to blower.
- _____ 10. 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 the valve be re-seated properly.

COMMENTS: _____

