



**R.F. MacDonald Co.**

*your boiler & pump solutions team*

*~ since 1956*



# **EQUIPMENT MAINTENANCE PLAN**

[ Reduced visit total also available as the **Semi-Annual Maintenance Plan** ]

## Monthly Maintenance Plan



Our **PRINCIPAL COVERAGE** includes all of the inspections and tests in our Annual Maintenance Plan as well as three (3) additional on-site visits. Your boiler system will receive the necessary technical assessments, testing, and fine-tuning of the fuel-to-air combustion curve(s) to maximize burner combustion efficiency. This quarterly program will help extend equipment life.

As a part of this plan, preventive maintenance will be performed on a quarterly basis. The inspections and tests listed below will be completed three (3) times a year in addition to one (1) Annual Maintenance visit. We also offer an alternative option, the **Semi-Annual Maintenance Plan**, which provides the same features listed below in only two (2) total scheduled visits annually.

On-site maintenance guidelines are subject to customer needs, local jurisdictional authority requirements and may vary at the local level. Please review our proposal for local details.

Our **MAXIMUM COVERAGE** offers the best protection against system failure and downtime. It is performed in addition to our Quarterly & Annual Maintenance Plans. On a monthly basis, we will inspect the boiler equipment for irregularities and fine-tune the fuel-to-air combustion curve(s) to maximize burner combustion efficiency. A significant benefit of this program is proactive boiler operational awareness to optimize system performance and minimize operational costs.

As a part of this plan, preventive maintenance will be performed every month. The inspections and tests listed below will be completed eight (8) times a year in addition to one (1) Annual Maintenance visit and three (3) Quarterly Maintenance visits.

On-site maintenance guidelines are subject to customer needs, local jurisdictional authority requirements and may vary at the local level. Please review our proposal for local details.

### Combustion and Controls

- Inspect all actuators & motors for abnormal operation
- Inspect atomizing media equipment
- Inspect boiler & burner components for wear
- Inspect burner flame pattern
- Inspect firing rate control
- Inspect flue, vent, stack, & outlet dampers
- Inspect fuel train(s), regulator(s), & valves
- Inspect gauges, monitors, & indicators
- Inspect inlet & outlet dampers
- Inspect instruments & equipment settings
- Inspect linkage, drive arms, & damper connections for wear
- Inspect pilot & main fuel flame signal strength
- Inspect pilot line, regulators, & valves
- Inspect the blower motor operations
- Test & reset combustion
- Secondary fuel tune-up (Available on request)

### Fireside

- Inspect boiler for visible signs of hot spots & discoloration

### Waterside

- Blow down the gauge glass assembly
- Inspect the safety relief valves for leakage
- Inspect the feed water valve & controls for operation
- Inspect water column & gauge glass for wear & etching
- Test water column water level ports

### Combustion and Controls

- Inspect all actuators & motors for abnormal operation
- Inspect all lights, indicators, & alarms for functionality
- Inspect atomizing media equipment
- Inspect boiler & burner components for wear
- Inspect burner flame pattern
- Inspect firing rate control
- Inspect flue, vent, stack, & outlet dampers
- Inspect fuel train(s), regulator(s), & valves
- Inspect gauges, monitors, & indicators
- Inspect igniter for damage & wear
- Inspect inlet & outlet dampers
- Inspect instruments & equipment settings
- Inspect linkage, drive arms, & damper connections for wear
- Inspect pilot & main fuel flame signal strength
- Inspect pilot line, regulators, & valves
- Inspect the blower motor operations
- Perform a pilot turndown test
- Perform leak test on pilot & fuel train(s)
- Test & reset combustion
- Test flame failure detection system for pilot & main fuel(s)
- Secondary fuel tune-up (Available on request)

### Fireside

- Inspect boiler for visible signs of hot spots & discoloration

### Waterside

- Blow down the gauge glass assembly
- Inspect blowdown valves & equipment for leakage & wear
- Inspect the safety relief valves for leakage
- Inspect the feed water valve & controls for operation
- Inspect water column & gauge glass for wear & etching
- Test water column water level ports
- Perform a slow drain test on low water cutoff

Pair With Tier Options for Contract Term Length  
Read [Terms of Plan Membership](#) for more info on benefits

5 YEARS 3 YEARS 2 YEARS 1 YEAR

Pair With Tier Options for Contract Term Length  
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5 YEARS 3 YEARS 2 YEARS 1 YEAR

# Annual Maintenance Plan



This **CORE COVERAGE** provides professional technical resources to improve the safety, reliability, and efficiency of your boiler system. We will conduct the necessary assessments, tests, and maintenance to fully support your boiler's optimum operation. At the end of the required Annual Inspection, the boiler will be closed and fitted with new high-quality gaskets. You can be assured that we will replace degraded and/or failed parts to ensure maximum system performance. All findings will be documented and reviewed with you.

On-site maintenance guidelines are subject to customer needs, local jurisdictional authority requirements and may vary at the local level. Please review our proposal for local details.

## Combustion and Controls

- Inspect all actuators & motors for abnormal operation
- Inspect all lights, indicators, & alarms for functionality
- Inspect & clean all burner traps & strainers
- Inspect atomizing media equipment
- Inspect boiler & burner components for wear
- Inspect burner flame pattern
- Inspect firing rate control
- Inspect flue, vent, stack, & outlet dampers
- Inspect fuel nozzles & fuel outlet orifices
- Inspect fuel train(s), regulator(s), & valves
- Inspect diffuser positioning
- Perform a pilot turndown test
- Perform leak test on pilot & fuel train(s)
- Test & reset combustion
- Test & verify firing rate control set points
- Test flame failure safety shutdown timing
- Test fuel train(s) interlocks
- Test high & low fuel temperature/pressure interlocks
- Inspect gauges, monitors, & indicators
- Inspect igniter for damage & wear
- Inspect inlet & outlet dampers
- Inspect instruments & equipment settings
- Inspect linkage, drive arms, & damper connections for wear
- Inspect main fuel safety shutoff & vent valves for leakage
- Inspect pilot & main fuel flame signal strength
- Inspect pilot line, regulators, & valves
- Inspect the blower motor operation
- Inspect the diffuser & burner components for wear
- Test atomizing medium interlocks & set points
- Test burner position interlocks
- Test combustion air proving switch
- Test damper position interlocks
- Test flame failure detection system for pilot & main fuel(s)
- Test operating & high limit control functionality
- Test trial for ignitions & full sequence timing
- Secondary fuel tune-up (Available on request)

## Fireside

- Inspect boiler for visible signs of hot spots & discoloration
- Inspect fireside of boiler & clean debris or soot as required
- Inspect attaching mechanisms & open all access doors
- Inspect the refractory & insulation for wear

## Waterside

- Drain boiler, open manholes & handholes for inspection
- Inspect & flush waterside of boiler
- Inspect PV for cracks, visible corrosion & scale
- Inspect the feed water valve & controls for operation
- Open & inspect internals of low water cutoff equipment
- Test safety relief valves for proper operation (as requested)
- Blow down the gauge glass assembly
- Inspect & flush pressure control tree as needed
- Inspect blowdown valves & equipment for leakage & wear
- Inspect the safety relief valves for leakage
- Inspect water column & gauge glass for wear & etching
- Perform a slow drain test on low water cutoff
- Test water column water level ports

Pair With Tier Options for Contract Term Length  
Read [Terms of Plan Membership](#) for more info on benefits

5 YEARS 3 YEARS 2 YEARS 1 YEAR

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# Terms of Plan Membership



## Equipment Maintenance Plan

We offer **Monthly and Quarterly Maintenance Plans** to maintain optimum performance, improve system stability, extend equipment life, and minimize risk of a system failure. By participating in our **Annual Maintenance Plan** your equipment will receive the necessary assessments, testing, and maintenance to fully support the required annual inspection. At the end of the Annual Maintenance, the boiler will be closed and fitted with new high-quality gaskets. All findings will be properly documented and thoroughly reviewed with you.

On-site maintenance guidelines are subject to customer needs, local jurisdictional authority requirements, and may vary at the local level. Please review our proposal for local details.

In addition to offering customizable options for the frequency of maintenance services, we also provide the ability to select the corresponding term duration, indicating the length of the membership contract. We've divided these options into four (4) tiers, each one coming with complimentary benefits added to the extended length.

## Membership Term Options

- 5 YEARS** **Five Year Membership Plan**
- Fixed labor rate for three (3) years
  - 15% discount on parts for any equipment
  - Two (2) free training classes at a local seminar
  - Priority scheduling benefits

- 3 YEARS** **Three Year Membership Plan**
- Fixed labor rate for two (2) years
  - 10% discount on parts for equip. in contract
  - One (1) free training class at a local seminar
  - Priority scheduling benefits

- 2 YEARS** **Two Year Membership Plan**
- Fixed labor rate for two (2) years
  - 5% discount on parts for equip. in contract
  - Priority scheduling benefits

- 1 YEAR** **One Year Membership Plan**
- 5% discount on parts for equip. in contract
  - Priority scheduling benefits

CHOOSE YOUR PLAN

## Why Should You Invest?

- Improve operational stability
- Improve burner combustion efficiency
- Improve boiler heat transfer efficiency
- Enhance safety and issue identification
- Reduce long-term repair cost
- Discounted parts quotes where needed
- Fixed labor erase inconvenience service fees
- Reduce annual inspection difficulties
- Priority access to technical expertise & service support
- Priority access to R.F. MacDonald Co. parts inventory
- Single-source responsibility for boiler system support
- Extend equipment life

## Equipment Maintenance



### Preventive Maintenance

Routine Boiler and Pressure Vessel inspections are required by local jurisdictions. Typically, these critical inspections are required annually, but in some rare cases, they can be required bi-annually. The inspection frequency is determined by local laws and regulations. As such, Boiler and Pressure Vessel inspections are unavoidable and will result in a boiler and/or boiler system to be temporarily taken offline. The specific details involved to perform an annual inspection can be overwhelming for companies that do not have the resources to stay current with changing compliance regulations. As a result, it is beneficial and very common for companies to engage in knowledgeable technical resources who can easily navigate the inspection process. Outsourcing this responsibility to trained technicians can facilitate an expedient and successful approval by the local jurisdiction while enhancing your preventive maintenance objectives.



### Optimization Activities

Whether or not you choose to utilize our Preventive Maintenance Program, we highly recommend that you take steps to insure that your boiler equipment is protected.

#### Controls

Proper water levels, operating pressures, and control devices are critical to your boiler system's performance. Carefully check gauge glass for cracks or erosion and inspect the float and switches. Check the operation of all limit switches and sequences of operation timing.

#### Burners

Remove, check and clean dampers, nozzles, electrodes, scanners, hoses, compressors, filters, diffusers, etc. for blockage and/or damage.

#### Refractory

Check for cracking. Unrepaired, even mirror cracks can reduce boiler efficiency and allow warping and damage to occur on vital metal surfaces.

#### Fireside

Clean out any detectable soot can reduce the efficiency of your boiler tubes, tube sheets, and furnace area. Replace fireside gaskets when closing the boiler.

#### Waterside

Drain, open and flush entire waterside of the boiler. Remove all low water controls to clean and inspect piping. Flush makeup and/or feed water pump strainers and water column float chambers. Drain expansion tanks and remove all plugs in control piping. Inspect and re-install controls. Inspect for damage due to waterside leakage around handholes and manholes, gauge glass assemblies and other wet surfaces. Check gaskets for wear and tear.

### Boiler Training Courses

- AFE & CWEA certified courses
- Train under credited boiler experts
- Attend sessions at regional RFM offices
- Learn proper equipment management & operation
- Learn the warning signs & safe facility procedures
- Visit [rfmacdonald.com/training](http://rfmacdonald.com/training) for more information

### Boiler Parts & Equipment

With an expert staff boasting knowledge and experience with a wide range of equipment and situations, R.F. MacDonald Co. has the ideal team to provide you the best in boiler parts and service. Paired with a fast response time and massive inventory (totaling at \$5 million worth of equipment), R.F. MacDonald Co. is your single source partner and ultimate supplier. Our selection is diverse as we represent many manufacturers, like the following...



### Field Services & Locations

R.F. MacDonald Co. offers service and maintenance plans to keep your equipment in top operating condition. Our factory-trained and certified technicians are available **24/7** for general field service throughout California and Nevada. (24 hours a day, 7 days a week)

We offer specialized services to keep your equipment operating at peak efficiency. These services include inspection and testing as well as predictive and preventative maintenance programs to help decrease downtime while increasing equipment longevity.

We employ ASME-code certified welders and a fleet of fully equipped service trucks which can be quickly dispatched to your job site to perform the following services with our General Engineering Contractor licenses A, C-4 (CA).



# Program Overview



## Equipment Maintenance Plan (EMP)

We offer **Monthly and Quarterly Maintenance Plans** to maintain optimum performance, improve system stability, extend equipment life, and minimize risk of a system failure. By participating in our **Equipment Maintenance Plan** your equipment will receive the necessary assessments, testing, and maintenance to fully support the required annual inspection. At the end of the Annual Maintenance inspection, the boiler will be closed and fitted with new high-quality gaskets. All findings will be documented and reviewed with you.

On-site maintenance guidelines are subject to customer needs, local jurisdictional authority requirements, and may vary at the local level. Please review our proposal for local details. The following list covers the different services provided under each EMP option, categorized by associatin under each of the **Annual (A)**, **Quarterly/Semi-Annual (Q)**, or **Monthly (M) Maintenance Plans**.

### Combustion & Controls

<b>A</b>	Inspect & clean all burner traps & strainers	<b>A + Q</b>	Test flame failure detection system for pilot & main fuel(s)
<b>A + Q + M</b>	Inspect all actuators & motors for abnormal operation	<b>A</b>	Test flame failure safety shutdown timing
<b>A + Q</b>	Inspect all lights, indicators, & alarms for functionality	<b>A</b>	Test fuel train(s) interlocks
<b>A + Q + M</b>	Inspect atomizing media equipment	<b>A</b>	Test high & low fuel temperature/pressure interlocks
<b>A + Q + M</b>	Inspect boiler & burner components for wear	<b>A</b>	Test operating & high limit control functionality
<b>A + Q + M</b>	Inspect burner flame pattern	<b>A</b>	Test trial for ignition & full sequence timing
<b>A + Q + M</b>	Inspect firing rate control	<b>A + Q + M</b>	Secondary fuel tune-up (Available on request)
<b>A + Q + M</b>	Inspect flue, vent, stack, & outlet dampers		
<b>A</b>	Inspect fuel nozzles & fuel outlet orifices		
<b>A + Q</b>	Inspect fuel train(s), regulator(s), & valves		
<b>A + Q + M</b>	Inspect gauges, monitors, & indicators		
<b>A + Q</b>	Inspect igniter for damage & wear		
<b>A + Q + M</b>	Inspect inlet & outlet dampers		
<b>A + Q + M</b>	Inspect instruments & equipment settings		
<b>A + Q + M</b>	Inspect linkage, drive arms, & damper connections for wear		
<b>A</b>	Inspect main fuel safety shutoff & vent valves for leakage		
<b>A + Q + M</b>	Inspect pilot & main fuel flame signal strength		
<b>A + Q + M</b>	Inspect pilot line, regulator & valves		
<b>A + Q + M</b>	Inspect the blower motor operations		
<b>A</b>	Inspect the diffuser & burner components for wear		
<b>A</b>	Inspect the diffuser positioning		
<b>A + Q</b>	Perform a pilot turndown test		
<b>A + Q</b>	Perform a leak test on pilot & fuel train(s)		
<b>A + Q + M</b>	Test & rest combustion		
<b>A</b>	Test & verify firing rate control set points		
<b>A</b>	Test atomizing medium interlocks & set points		
<b>A</b>	Test burner position interlocks		
<b>A</b>	Test combustion air proving switch		
<b>A</b>	Test damper position interlocks		

### Fireside

<b>A</b>	Inspect attaching mechanisms & open all access doors
<b>A + Q + M</b>	Inspect boiler for visible signs of hot spots & discoloration
<b>A</b>	Inspect fireside of boiler & clean debris or soot as required
<b>A</b>	Inspect the refractory & insulation for wear

### Waterside

<b>A + Q + M</b>	Blow down the gauge glass & assembly
<b>A</b>	Drain boiler, open manholes & hand holes for inspection
<b>A</b>	Inspect & flush pressure control tree as needed
<b>A</b>	Inspect & flush waterside of boiler
<b>A + Q</b>	Inspect blowdown valves & equipment for leakage & wear
<b>A</b>	Inspect PV for cracks, visible corrosion & scale
<b>A + Q + M</b>	Inspect safety relief valves for leakage
<b>A + Q + M</b>	Inspect the feed water valve & controls for operation
<b>A + Q + M</b>	Inspect water column & gauge glass for wear & etching
<b>A</b>	Open & inspect internals of low water cutoff equipment
<b>A + Q</b>	Perform a low drain test on low water cutoff
<b>A</b>	Test safety relief valves for proper operation (as requested)
<b>A + Q + M</b>	Test water column water level ports

### EMP Contract Term Options

The full term length of the associated EMP contract:	5 YEARS	3 YEARS	2 YEARS	1 YEAR
Term length of Fixed Labor Rate (no added labor fees):	3 years	2 years	2 years	-
Percent (%) discount on parts for equipment on contract:	*15%	10%	5%	5%
Total of free RFM training courses available per year:	2	1	-	-
Priority scheduling benefits as a contracted member:	✓	✓	✓	✓

\* = 15% Parts Discount for PLATINUM tier applies to purchased parts for ANY equipment, and therefore it is not confined to the contract

## EQUIPMENT MAINTENANCE PLAN



Safety



Efficiency



Predictive Maintenance



Reliability



Compliance

R.F. MacDonald Co. offers service and maintenance plans to keep your equipment in top operating condition. Our factory-trained and certified technicians are available for field service throughout California and Nevada, 24 hours a day, 7 days a week. Field services include troubleshooting, diagnostics, repair, installation, monitoring, and calibration.

Our vast parts inventory combined with our mobile and rental equipment ensures minimal downtime of your equipment. We have over 125 fully stocked service vehicles utilizing wireless dispatching to provide timely and accurate service. We provide in-house fabrication services for assembling boiler packages and custom systems into pre-piped and wired skids, simplifying field installation requirements. Contact an office near you to speak directly with a local representative who can personally assist you with your facility equipment requirements. We would be honored to serve your needs.



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