

I. Scope

A. Preventive maintenance and repair services shall be provided by the Contractor on all equipment and associated devices related to the HVAC systems as outlined within the specifications.

B The Contractor shall furnish all personnel, parts, material, test equipment, tools, ladders and service in conformance with the terms and conditions as outlined below.

C. It is the intention of these specifications to establish and define those services that are to be performed.

D. The Contractor shall not be relieved from assuming any and all responsibility for properly estimating the difficulties and cost of performing the services required within this specification, because of failure to investigate the conditions or become thoroughly acquainted with all the information concerning the services to be performed.

E. The Agency assumes that the system(s) being quoted upon is in maintainable condition and shall be accepted as is.

II. Contractor Qualifications

A. The following requirements shall be considered as the minimum standards for the employees of the Contractor to be considered as qualified to provide services under this Contract, and shall be a prerequisite to any award.

1. Certified, qualified and trained service personnel shall perform services that are to be provided. The Agency shall reserve the right to require that the Contractor dismiss any and all unacceptable personnel for due and just cause as determined by the Agency.

2. The Contractor's preventive maintenance program shall be computer generated, based on run time, manufacturer's recommendations, and historical data bank of similar equipment. Simple computer base, run time only, or hand scheduled programs, are not acceptable.

3. The Contractor shall actively employ a minimum of five HVAC journeyman class service technicians within an 80 mile radius of the Agency. Journeyman shall have a minimum of three years of journeyman level experience. Copies of certification shall be supplied upon request to the Agency.

4. The Contractor shall actively employ a minimum of two "Liebert Factory Certified USA Contractor" service technicians within an 80 mile radius of the Agency. Liebert technicians shall have a minimum of two years journeyman level experience with "Liebert Factory Certified USA Contractor" certification. Copies of individual certification shall be supplied to the Agency.

III. Equipment- Maintenance Service

A. Equipment - Not Included

1. Maintenance services, including repair labor and parts replacement, for portions of the systems and equipment that are non-maintainable or nonmoving, are not required and not included as part of this specification.

2. Excluded items shall be considered as: foundations, structural supports, domestic water lines, drains, plumbing, oil lines, gas lines, piping, oil storage tanks, boiler shell and tubes, unit cabinets, boiler trim, refractory material, and cooling tower structure.
3. This specification covers only that equipment as listed herein, and in the event the system is altered, changed or equipment is added or not included in this specification, that portion shall be added or deleted as required, and shall be in accordance with this specification.

IV. EQUIPMENT MAINTENANCE SERVICE

A. Equipment Included

1. The specific quantities, sizes, and model numbers of the major pieces of equipment shall be listed separately on the equipment list.

2. The preventive maintenance and the responsibility of the Contractor shall not be limited to only these major pieces of equipment as shown on the equipment list, but shall also include all appurtenant devices and systems as listed below that are related, but not limited to the HVAC system.

a. Heating System

Boilers, elements, furnaces, pumps, heating coils, steam traps, water strainers, unit heaters, duct heaters, heat exchangers, humidifiers.

b. Cooling System

Air conditioning compressor(s), evaporative condensers, air cooled condensers, cooling towers, cooling tower fans, pumps, water chillers, cooling coils.

c. Air Handling System

Fans, motors, air filters, dampers, induction units, mixing boxes, fan coil units.

d. Miscellaneous Equipment

Exhaust fans, water fountains, manual valves, float valves, direct expansion valves, thermometers, gauges, magnetic starters, manual motor starters, pump and fan motor drives, belts, electrical wiring from motor starter to their respective motor(s), check valves, refrigerant piping and piping insulation.

e. Duct Work

Service work is to include all parts, but not limited to materials and labor to maintain entire existing ductwork.

f. Emergency Generator

Service is to include all parts, but not limited to voltage regulator, rheostat, automatic transfer switch including appurtenant parts/devices, batteries, oil and filters, coolant, air filters, materials and labor. Batteries shall be tested annually and shall be replaced after 2 years and/or as needed. Service shall be performed by a certified Caterpillar Diesel technician. The annual service shall include a load test to be completed no later than November 30.

B. Services Included

1. The general services listed below shall apply to the systems and equipment as shown on the equipment list.

- a. Lubricate all equipment monthly and/or as needed to permit bearings, gears, and all contact wearing points to operate freely and without undue wear.
- b. Adjust all linkage, motors, drives, etc. that have drifted from the initial design setting, and positions.
- c. Calibrate all sensing, monitoring, output, safety, and optimum efficiencies.
- d. Test and cycle all equipment as a system after it has been cleaned, lubricated, adjusted, and calibrated to assure that it is in proper operating condition and performing at optimum efficiency.
- e. Replace filters as noted on filter schedule.
- f. Clean all components of dust, old lubricants, etc. to allow the equipment to function as designed.
- g. Paint all equipment as needed to prevent and protect against corrosion and deterioration.
- h. Examine each piece of equipment and device to see that it is functioning properly and in good operational condition.
- i. Perform annual (or upon request) vibration analysis on all air-handling units and supply documented results within 15 days to the Agency.
- j. Perform annual (or upon request) vibration analysis on chillers and supply documented results within 15 days to the Agency.

C. Additional Services

1. For other additional services that apply to this equipment maintenance section, refer to the following sections:

a. MAINTENANCE PROCEDURES AND RECORDS

b. PREVENTIVE MAINTENANCE AND EMERGENCY SERVICE

V. Maintenance Procedures and Records

A. The Contractor shall utilize computer generated preventive maintenance directions, which indicate task functions to be performed on each scheduled service call, as determined by calendar periods, operating hours, runtime, manufacturer's recommendations, historical data bank, as pertinent to each task. Detailed written service reports shall be submitted to the Agency at the time of service.

B. The Contractor shall issue, to the mechanic on the job, the necessary and appropriate recommended maintenance procedure, tools, ladders, etc., that are required for proper maintenance.

C. The Contractor's administration system shall provide for continuous updating of maintenance procedures and frequencies. Breakdown experience and frequency shall determine the on-site material inventory level and preventive maintenance frequencies.

D. The Contractor shall communicate with the Agency on a daily or on an as needed basis by utilizing e-mail, text or telephone as communication. Contractor shall respond accordingly by same means of communication within 24 hours.

E. During the course of the service program, the Contractor shall advise and assist in the determination of improvements to the mechanical system that shall conserve energy and minimize utility expenditures.

F. The Contractor's routine preventive monthly maintenance shall be provided and completed no later than the first 10 normal work days of operation of each month. Routine monthly preventive maintenance shall be scheduled at least 1 month in advance with the Agency.

G. Contractor shall perform an annual vibration analysis on all air-handlers and centrifugal chillers and submit a documented written report within 15 days to the Agency defining any problems found and recommended corrective action.

H. Parts to HVAC equipment vital to the operation of the Agency that are in need of immediate repair shall be ordered same day and shipped "Next Day Air" at the expense of the Contractor.

All repairs to the operation of the Agency deemed vital shall be completed without delay.

1- HVAC Equipment vital to the operation of the Agency include, but not limited to *chillers, emergency chiller, air-handlers, Liebert, emergency generator including automatic transfer switch, cooling towers, pumps, boilers, electrical...*

*Contractor shall not remove or use any parts from other machinery for repairs. All parts shall be replaced with newly manufactured parts of equal or greater value. All repairs and replacement parts shall be noted, documented, and signed by the Contractor at the time of the service. A copy of the report shall be given to the Agency at the time of service.

*Subcontracting portions of system or services shall have prior written approval by the Agency. The Agency shall reserve the right to interview and approve all subcontractors. The Agency reserves the right to dismiss and/or terminate service for noncompliance. It is the responsibility of the Contractor to insure that all materials meet Contract specifications.

VI. Preventive Maintenance and Emergency Service Calls

A. The Contractor shall provide monthly preventive maintenance service and schedule at least 1 month in advance with the Agency. Service shall be performed within the first 10 operating work days of each month.

1. At time of service, a detailed paper service report of services rendered shall be completed and left with the Agency.
2. Two of the scheduled service calls shall include the system startup and the system shutdown, for the appropriate season.

B. The Contractor shall provide emergency service on an as-required basis. Emergency service shall be considered as called in addition to the scheduled preventive maintenance calls, but included in this agreement.

1. This emergency service shall be provided as often as needed, 24 hours, 7 days including nights, weekends and legal holidays.
2. The Contractor shall be capable of responding to an emergency within 2 hours.

3. The emergency service response system shall be a professionally manned telephone answering service. Automatic telephone answering/recording machines or home telephone numbers are not acceptable.

C. The Contractor shall schedule quarterly, semi-annual and annual preventive maintenance services with the Agency no less than 2 days in advance.

1. Annuals shall be completed no later than November 30. Failure to comply with specifications herein shall constitute cause for termination of services and/or withholding or forfeit of payment.

Contract Guarantee

A. Contractor shall maintain all instrumentation devices and systems in complete operating condition subject to the approval of the owner. The Contractor, in effect, will guarantee these systems for the term of this operations and maintenance contract.

B. Contractor shall provide full maintenance and service of the entire system including replacement of the parts and materials for the entire term of the contract for any failures. The cost of this maintenance and service program shall be included in the cost of this contract.

C. Contractor shall provide a minimum 60 day cancellation notice in writing. Said notice shall be provided to the Agency, in addition to State Procurement.

VII. Service Performance Guarantees

A. Performance Review

1. The Agency may review, at any time, the services provided and reports submitted, to verify that the preventive maintenance is, in fact, being properly and adequately performed.

2. Problems and/or deficiencies of significant importance and/or of a continual nature shall constitute cause for termination of services and/or withholding or forfeit of payment.

B. Non-Performance:

1. Failure to repair vital HVAC equipment within 2 days.
2. Failure to answer calls and respond within 2 hours.
3. Falsifying records.
4. Failure to correct recurring problems of not more than three attempts.
5. Failure to submit service records at time of service.
6. Failure to submit test analysis reports within 30 days.
7. Failure to perform annual vibration analysis on equipment specified.
8. Failure to complete routine preventive monthly maintenance within the first ten normal work days of operation of each month.
9. Failure to schedule and complete scheduled quarterly, semi-annual and annual preventive maintenance.
10. Failure to replace odor oxidant media and filters as scheduled.
11. Failure to communicate with the Agency monthly and/or on an as needed basis by e-mail, text or telephone.
12. Non-compliance with minimum performance standards.

*The Agency reserves the right to hire a consultant to examine and provide a written report on conditions as found. If substandard conditions exist, it will be reported and corrective action by the Contractor shall be corrected within 10 days. If the Contractor cannot furnish a valid documented reason for the delay, the Agency reserves the right to employ another Contractor to make the necessary repairs. The accumulated cost of such expenditures will be billed to the current Contractor.

*The Agency reserves the right to suspend payments at regular monthly billing rates, terminate services and/or withhold or forfeit of partial payment for non-compliance.

VIII. Special Condition

A. The Contractor's responsibility for injury to persons or property that may be caused by, or arise through the maintenance, service, functioning, or use of the system, shall be limited to injury caused directly by the Contractor's obligations as set forth in this specification.

IX. PREVENTIVE MAINTENANCE TASK SHEET

A. Air Handling Units

Monthly Maintenance

- Inspect overall unit for vibration and appearance; make adjustments/repairs as necessary.
- Inspect air filters and replace if necessary.
- Inspect condensate drain and clean if necessary.
- Inspect belts and adjust if necessary.
- Inspect bearings and grease if necessary.

Quarterly Maintenance

- Inspect bearings.
- Inspect belts.
- Inspect sheaves.
- Inspect squirrel cage.
- Inspect motor and electrical systems.
- Perform megohm test on motors (20 h/p and above).
- Inspect coil for buildup of lint or dust.
- Inspect overall unit for vibration and appearance; make adjustments/repairs.

Annual Maintenance

- Perform vibration analysis.
- Inspect sheaves.
- Inspect bearings.
- Inspect belts.
- Inspect squirrel cage.
- Inspect motor and electrical systems.
- Perform megohm test on motors (20 h/p and above).
- Inspect coil for buildup of lint or dust and coil if required.

- Inspect overall unit for vibration and appearance; make adjustments/repairs as necessary.

B. Centrifugal Chillers

Monthly Maintenance

- Inspect unit for leaks.
- Inspect motor starter contacts.
- Inspect compressor oil level and color.
- Inspect entire unit for appearance; make adjustments/repairs as necessary.
- Check evaporator and condenser pressure, oil tank pressure, differential oil pressure and discharge oil pressure.
- Check oil level in the sump while chiller is running.

Quarterly Maintenance

- Perform oil analysis; replace as necessary.
- Inspect unit for leaks.
- Inspect motor contacts.
- Inspect compressor oil level and color.
- Perform megohm test on compressor motor.
- Inspect entire unit for appearance.
- Lubricate vane control linkage bearing, ball joints and pivot points to factory specifications.
- Lubricate first stage vane operator tang-o-rings to factory specifications.
- Clean all water strainers in water piping system.
- Lubricate oil filter shutoff valve o-rings to factory specifications.

Semi-Annual Maintenance

- Inspect air-cooled condenser coil and clean as recommended by factory specifications.
- Inspect purge tank and carbon tank insulation for damage or degradation; make necessary repairs to insulation.

Annual Maintenance

- Record and perform annual maintenance procedures referred to in the maintenance section of the purge and operation manual; make adjustments/repairs as necessary.
- Replace oil and filter.
- Inspect and clean condenser tubes.
- Measure compressor motor winding resistance to ground.
- Perform leak-test. (system must be pressurized)
- Inspect condenser and evaporator tubes using a nondestructive tube test.
- Clean all water strainers in water piping system.
- Perform purge system control checks.
- Check all internal components in purge control panel for corrosion, terminal tightness, signs of overheating, etc.
- Change the return line filter-drier assembly.
- Perform vibration analysis.

C. Emergency Caterpillar GeneratorMonthly Maintenance

- Functionally check operation; make adjustments/repairs as necessary.
- Inspect belts; adjust and/or replace as necessary.
- Inspect fan.
- Inspect & top off coolant as needed.
- Inspect radiator and hoses for leaks.

Annual Maintenance

- Functionally check operation; make adjustments/repairs as necessary.
- Change oil, oil filters and air filter.
- Check belts; replace as necessary.
- Check batteries; replace as necessary.
- Inspect & clean diesel sump pump.
- Inspect batteries; replace as necessary.
- Inspect water hoses; replace as necessary.
- Replace coolant annually.
- Full load test shall be performed.

D. Cooling TowersMonthly Maintenance

- Inspect water level and adjust floats as necessary or upon request.
- Inspect fan belts; adjust and/or replace as necessary or upon request.
- Check controls and calibrate as necessary or upon request.
- Check fan motor and sheave.
- Check oil level in gear box and add oil as necessary.
- Inspect general appearance and structure; make adjustments/repairs as necessary.
- Check water clarity; drain water and clean as necessary or upon request.

Quarterly Maintenance

- Check fan, sheave & perform megohm test motors 20 H/P and above.
- Check oil level in gear box and add oil as necessary or upon request.
- Inspect general appearance and structure; make adjustments/repairs as necessary.
- Drain, clean, and fill water reservoir.

Annual Maintenance

- Inspect water level and adjust floats as necessary or upon request.
- Inspect fan belts; adjust and/or replace as necessary or upon request.
- Check controls and calibrate as necessary or upon request.
- Check water clarity; drain and clean as necessary or upon request.
- Check fan motor and sheave.
- Check oil level in gear box and add oil as necessary.
- Inspect general appearance and structure; make adjustments/repairs as necessary.

- Check water clarity; drain water and clean.

*Cooling towers shall be flushed and cleaned two times per year and/or upon request.

E. Exhaust Fans

Quarterly Maintenance

- Inspect sheave.
- Inspect bearings and grease as required or upon request.
- Inspect belts, tighten and/or replace as necessary or upon request.
- Inspect motors and electrical; make adjustments/repairs as necessary or upon request.

F. Vacuum Pump

Monthly Maintenance

- Functionally operate pump and check operation; make adjustments/repairs as necessary.

Annual Maintenance

- Functionally operate pump and check operation; make adjustments/repairs/replace as necessary.
- Replace oil.

G. Water Pumps

Monthly Maintenance

- Inspect pump seal for excessive water loss; make adjustments/repairs/replace as necessary or upon request.

Quarterly Maintenance

- Inspect pump seal for excessive water loss; make adjustments/repairs/replace as necessary or upon request.
- Perform megohm test on motors 20 HP and above.
- Inspect and grease bearings.

Annual Maintenance

- Clean strainer screens

H. Boilers

Monthly Maintenance

- Inspect; make adjustments/repairs as necessary.

Annual Maintenance

- Calibrate all operating and safety controls; make adjustments/repairs as necessary.
- Check coils; make repairs; replace as necessary.

I. Hot Water HeatersMonthly Maintenance

- Check operation; make adjustments/repairs/replace as necessary.
- Calibrate controls.
- Inspect general appearance.

J. Liebert UnitsMonthly Maintenance

- Inspect filters; replace as necessary or upon request.
- Inspect belts; replace as necessary or upon request.

Quarterly Maintenance

- Inspect air filters; replace as necessary or upon request.
- Inspect belts; replace as necessary or upon request.
- Perform megohm test on compressor motor.
- Inspect all controls; calibrate as necessary; make adjustments/repairs as necessary.

Annual Maintenance

- Inspect air filters; replace as necessary or upon request.
- Inspect belts; replace as necessary or upon request.
- Perform megohm test on compressor motor.
- Inspect all controls; calibrate; make adjustments/repairs as necessary.
- Change compressor oil and filters.
- Clean water coil.

K. Water FountainsMonthly Maintenance

- Check Operation; make adjustments/repairs/replace as necessary.
- Inspect coils; clean as needed or upon request.

L. Emergency ChillerMonthly Maintenance

- Start/check operation; make adjustments/repairs as necessary.
- Inspect for leaks.
- Inspect compressor oil level and color.

Annual Maintenance

- Check operation; make adjustments/repairs as necessary.
- Inspect for leaks.
- Inspect motor starter contacts.
- Inspect compressor oil level and color.
- Inspect entire unit; make adjustments/repairs as necessary.

- Inspect refrigerant oil level; replace as needed.
- Inspect and clean condenser tubes.
- Perform megohm test on compressor.
- Perform vibration analysis

LOW PRESSURE CENTRIFUGAL CHILLERS

Annual Equipment Shutdown Inspection and PM

The following tasks shall be performed a minimum of once each year, or as necessary.

1. Check the Compressor-Motor Assembly for the following items and perform PM Tasks as indicated:

- Record voltage
- Meg and record motor winding resistance
- Lubricate open motor
- Check the alignment on open drive units
- Check the coupling
- Check seal
- Check inlet vane operator and linkage; lubricate as required

2. Check the Compressor Oil System for the following items:

- Change oil, filter and dryer
- Conduct analysis on oil and oil filter; send to an independent laboratory for testing upon request
- Check oil pump operation
- Clean the dirt leg
- Check heater and thermostat
- Check all other oil system components including cooler, strainer and solenoid valve where applicable

3. Check Motor Starter and perform the following tasks:

- Run diagnostic check
- Clean contacts; replace as needed
- Check linkage
- Meg motor
- Check all terminals and tighten connections
- Check overloads, dash pot oil and calibrate
- Clean or replace air filter where required
- Dry run starter (or before start-up); check status lights

4. Review the Control Panel for the following items:

- Run diagnostic check of Micro Control Panel
- Check safety shutdown operation
- Check all terminals and tighten connections
- Check Display Data accuracy and set points

5. Review the Purge Unit for the follow items:

- Inspect the operation of the unit
- Change oil
- Clean filter dryer
- Clean orifice in the liquid feed-line to coil
- Clean solenoid valves
- Clean purge drum, check and clean float valve; replace gaskets
- Check heater operation
- Check all other components for proper condition and operation; record pressure control set point

6. Check the Condenser for the following items:

- Check the water flow
- Check flow switch operation
- Remove condenser head and inspect end sheets
- Mechanically brush cleaning condenser water tubes

7. Check the Cooler for the following items:

- Check the water flow
- Check flow switch operation
- Check refrigerant level

8. Check the System for the following items:

- Conduct a leak check and identify leak sources for repairs
- Add refrigerant as required
- Record condition of sight glasses
- Check the refrigerant cycle to verify the proper operating balance
- Check condenser water and chilled water heat transfer

9. General items included:

- Repair insulation removed for inspection and maintenance procedures
- Clean equipment and surrounding area upon completion of work
- Report deficiencies and necessary repairs to the Agency.

Seasonal Inspections

- Inspect chiller and adjust safety controls
- Check purge operation
- Check operation of controls
- Check oil and refrigerant levels
- Check operation of lube system
- Check the oil return system
- Check operation of motor and starter
- Record operating conditions
- Check log and review chiller and system operation with operator
- Conduct routine maintenance as recommended and as required
- Log and report repairs and parts replaced

Cooling Season Start-up Preparation and Inspection

- Pressurize the unit and conduct a leak check
- Check refrigerant and oil levels
- Check oil sump and purge oil heaters and temperatures
- Check and test all operating and safety controls
- Check the starter operation
- Start the chilled water pump
- Start the condenser water pump and cooling tower
- Start the chiller and calibrate controls
- Check purge unit operation
- Log operating conditions after system and unit stabilize
- Review operating procedures and owner's log with operator
- Check auxiliary equipment operation

*Contractor shall be responsible for all chiller materials including lubrication oil and refrigerant.

* Contractor shall schedule an annual vibration analysis on all chillers and all air-handling units. A complete detailed computer generated vibration analysis report along with recommendation for corrective action for repairs shall be reported in writing within 15 days to the Agency.

*Annuals on the HVAC system shall be completed no later than November 30.