Scheduled Maintenance Requirements Attachment, A

College reserves the right to remove all contract personnel not adhering to LOTO and/or failing to meet the minimum requirements as outlined in the description of contractor responsibilities.

AIR COOLED CHILLER

The following tasks are the minimum required services; any manufacturer recommended services not specifically mentioned below will also need to be included

1. **ANNUAL MAINTENANCE** - Once a year a thorough preventive maintenance schedule will be performed including the following:
   A. Leak check as required.
   B. Detailed inspection of condenser.
   C. Check condition of compressor contactors for wear, pitting, etc.
   D. Check safety controls.
   E. Meg compressor motor. Record readings.
   F. Check and tighten electrical connections.
   G. Tighten motor terminals and control panel terminals.
   H. Check oil heater and heater operation.
   I. Visually inspect condenser fans.
   J. Check freeze protection if applicable
   K. Check diagnostic alarms and programming, if applicable.
   L. Report any deficiencies noted to customer.

2. **SCHEDULED PREVENTATIVE MAINTENANCE** – One inspections during the operating season will be made and include:
   A. Check diagnostic alarms and programming if applicable.
   B. Record operating log of temperatures, pressures, voltages and amperages.
   C. Check compressor operation.
   D. Take oil sample and have analyzed for acid, moisture and wear metals content, if applicable (One time per year)
   E. Check customers log with operator discuss operation of the machine.

3. **COIL CLEAN** – Clean condenser coils once per year.

4. **START-UP** - Customer to schedule.
   a. Check diagnostic alarms and programming if applicable.
   b. Record operating log of temperatures, pressures, voltages and amperages.
   c. Check compressor operation.
   d. Check customers log with operator discuss operation of the machine.
WATER COOLED MACHINES

The following tasks are the minimum required services; any manufacturer recommended services not specifically mentioned below will also need to be included.

1. SCHEDULED ANNUAL MAINTENANCE - One time a year a thorough preventive maintenance schedule will be performed including the following:
   
   A. Leak check.
   B. Check condenser tubes contingent upon condenser isolation valves holding.
   C. Check condition of compressor contactors for wear, pitting, etc.
   D. Check safety controls.
   E. Check chilled water and condenser flow switches.
   F. Meg compressor motor. Record readings.
   G. Check and tighten electrical connections.
   H. Tighten motor terminals and control panel terminals.
   I. Check oil heater and heater operation.
   J. Check freeze protection if applicable.
   K. Check diagnostic alarms and programming, if applicable.
   L. Report any deficiencies noted to customer.

2. SCHEDULED PREVENTATIVE MAINTENANCE – One inspection during the operating season will be made and include:
   
   A. Check diagnostic alarms and programming if applicable.
   B. Record operating log of temperatures, pressures, voltages and amperages.
   C. Check compressor operation.
   D. Take oil sample and have analyzed for acid, moisture and wear metals content, if applicable.
      (One time per year)
   E. Check customers log with operator discuss operation of the machine.

3. CONDENSER TUBES – Brush condenser tubes one time per year

4. START-UP - Customer to schedule.
   
   a. Check diagnostic alarms and programming if applicable.
   b. Record operating log of temperatures, pressures, voltages and amperages.
   c. Check compressor operation.
   d. Check customers log with operator discuss operation of the machine.
CENTRIFUGAL CHILLERS

The following tasks are the minimum required services; any manufacturer recommended services not specifically mentioned below will also need to be included.

1. **ANNUAL MAINTENANCE** - Once a year a thorough preventive maintenance Schedule will be performed including the following:

   A. Clean oil strainer; replace oil filter and gasket.
   B. Leak check chiller if high purge minutes are present, and report conditions to owner.
   C. Detailed inspection of purge system, including filter change. Service the purge as recommended by the manufacturer.
   D. Clean contacts and check condition of contacts for wear, pitting, etc.
   E. Check and calibrate safety controls.
   F. Check chilled water and condenser flow switches
   G. Meg compressor motor. Record resistance readings.
   H. Check and tighten all electrical connections
   I. Tighten motor terminals and control panel terminals.
   J. Check oil heater leads, amp draw, and record oil temperature
   K. Check operation of vane actuator and vanes.
   L. Check diagnostic alarms and programming, if applicable
   M. Check programming and diagnostic of VFD starter if applicable
   N. Check electrical connections of VFD drive
   O. Report any unit deficiencies to customer's representative

2. **SCHEDULED PREVENTATIVE MAINTENANCE** - One inspection during the operating season will be made and include:

   A. Check readings of safety controls in panel and record readings.
   B. Complete operating logs.
   C. Check refrigerant charge and oil levels.
   D. Run purge unit and check for proper operation.
   E. Check starter operation, voltage and current.
   F. Check operation of lubrication system including oil pump and oil pressure regulator.
   G. Report any deficiencies to customer
   H. Take oil sample and have analyzed for acid, moisture and wear metals content, one time per year
   I. Provide a written report to customer’s representative

3. **CONDENSER TUBES** – Brush condenser tubes one time per year contingent on water isolation valves holding

4. **START-UP** - Customer to schedule.
   a. Check diagnostic alarms and programming if applicable.
   b. Record operating log of temperatures, pressures, voltages and amperages.
   c. Check compressor operation.
   d. Check customers log with operator discuss operation of the machine.
Scheduled Maintenance Requirements Attachment, A

COOLING TOWER

The following tasks are the minimum required services; any manufacturer recommended services not specifically mentioned below will also need to be included

1. SEASONAL START-UP:
   A. Clean debris from platform and surrounding area.
   B. Clean water sump and check condition.
   C. Clean float valve assembly and adjust for proper operation.
   D. Check and clean bleed off line and overflow.
   E. Clean tower strainers.
   F. Clean tower spray nozzles and eliminators.
   G. Flush cooling tower and cleaning.
   H. Check sump heaters and thermostats for calibration and operation.
   I. Check and adjust fan belts.
   J. Fill system after cooling tower has been cleaned.
   K. Check for leaks.
   L. Lubricate fan and motor bearings per manufacturer's recommendations.
   M. Check oil level in gear reducer per manufacturer’s recommendations
   N. Check amperage on motors.
   O. Check VFD and programming
   P. Inspect electrical connections, contactors, relays and operating safety controls.
   Q. Meg compressor motor >10HP. Record resistance readings.

2. SCHEDULED PREVENTATIVE MAINTENANCE: One inspection during the operating season will be made to include:
   A. Inspect fan, motor and belts.
   B. Check oil level in gear reducer.
   C. Check intake strainer, bleed and overflow.
   D. Check VFD and operation
   E. Check operating conditions. Adjust as required.

SEASONAL PUMP MAINTENANCE

The following tasks are the minimum required services; any manufacturer recommended services not specifically mentioned below will also need to be included

1. SEASONAL START-UP
   A. Clean pump strainers; contingent on isolation valves holding.
   B. Lubricate pump bearings.
   C. Lubricate motor bearings.
   D. Tighten all nuts and bolts. Check motor mounts and vibration pads (Replace and adjust as required).
   E. Visually check pump alignment and coupling.
   F. Check motor operating conditions.
   G. Inspect electrical connections and contactors.
   H. Inspect mechanical seals or pump packing. Adjust as required.
   I. Run pumps and check operation.
   J. Meg compressor motor >10HP. Record resistance readings.(Annual)
   K. Check VFDs (Adjustable Frequency Drives) if so equipped.
2. SCHEDULED PREVENTATIVE MAINTENANCE – 3000 Hour inspection during the operating season

PUMP MAINTENANCE

The following tasks are the minimum required services; any manufacturer recommended services not specifically mentioned below will also need to be included

1. SCHEDULED PREVENTATIVE MAINTENANCE – Quarterly inspection.
   A. Clean pump strainers; contingent on isolation valves holding.
   B. Lubricate pump bearings.
   C. Lubricate motor bearings.
   D. Tighten all nuts and bolts. Check motor mounts and vibration pads (Replace and adjust as required).
   E. Visually check pump alignment and coupling.
   F. Check motor operating conditions.
   G. Inspect electrical connections and contactors.
   H. Inspect mechanical seals or pump packing. Adjust as required.
   I. Run pumps and check operation.
   J. Meg compressor motor >10HP. Record resistance readings. (Annual)
   K. Check VFDs (Adjustable Frequency Drives) if so equipped.

VFD MAINTENANCE

The following tasks are the minimum required services; any manufacturer recommended services not specifically mentioned below will also need to be included

1. ANNUAL MAINTENANCE - Once a year a thorough preventive maintenance Schedule will be performed including the following:
   A. Check condition of connections.
   B. Check to be sure ventilation of drive is effective.
   C. Check for acceptable temperature around drive controller.
   D. Remove dust and debris from controller.
   E. Check LED’s for fault indication.
   F. Check Motor Resistance
   G. Observe relevant wave forms for best operation
   H. Verify power supply tolerance
Scheduled Maintenance Requirements Attachment, A

REFRIGERANT MONITOR SERVICE

The following tasks are the minimum required services; any manufacturer recommended services not specifically mentioned below will also need to be included.

SCHEDULED PREVENTIVE MAINTENANCE - **ONE** inspection during the operating season will be made and include:

A. Check and tighten all electrical connections.
B. Check chassis mounting in enclosure.
C. Check operation of Clear Language Display.
D. Check diagnostic alarms and programming.
E. Replace sampling filter element/elements as sensing points.
F. Visually check photo-acoustic sensing device.
G. Check periodic re-zeroing if applicable.
H. Clean unit including all printed circuit boards
I. Check calibration with certified calibration kit

UNITARY EQUIPMENT

The following tasks are the minimum required services; any manufacturer recommended services not specifically mentioned below will also need to be included.

1. SCHEDULED PREVENTATIVE MAINTENANCE – 1 annual inspection during the operating season will be made to include:
   A. Check unit for refrigerant leaks.
   B. Check controls and overloads.
   C. Meg compressor motor >10HP. Record resistance readings.
   D. Check main contactor; tighten all contactor terminals and check contacts.
   E. Confirm oil level in compressor (where applicable).
   F. Tighten motor terminals and controls panel terminals.
   G. Check crankcase heater.
   H. Verify external interlocks.
   I. Lubricate fan bearings.
   J. Inspect filters
   K. Replace belt annually **Regardless** of condition and **align** motor.
   L. Confirm damper operation. Lubricate and adjust as required.
   M. Check diagnostic alarms and programming, if applicable.
   N. Make operating log of temperatures, pressures, voltages and amperages, etc.
   O. Gas heat option.
      1 Check operation and calibration of gas train components.
      2 Confirm burner sequence of operation.
      3 Verify combustion blower and clean if required.
      4 Inspect heat exchanger.
      5 Verify operating controls.
   P. Electric heat option.
**Scheduled Maintenance Requirements Attachment, A**

1. Inspect electrical connections and contactors.
2. Confirm and calibrate all operating and safety controls.

Q. Heat pump option if applicable.
1. Check reversing valve operation
2. Check defrost operation

R. Check VFDs (Adjustable Frequency Drives) if so equipped.

S. Report any uncorrected deficiencies noted.

**T. COIL CLEAN – Clean condenser and evaporator coils once per year.**

2. **SCHEDULED PREVENTATIVE MAINTENANCE** – 3 inspection(s) during the operating season in addition to the annual inspection will be made to include:

   A. Check coils
   B. Check condensate pans
   C. Check fan belt and tension
   D. Check motor
   E. Lubricate motor, if applicable
   F. Check fan assembly
   G. Lubricate bearing, if applicable
   H. Check electrical connections
   I. Check controllers
   J. Check operation

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**AIR HANDLING Including EXHAUST FANS**

The following tasks are the minimum required services; any manufacturer recommended services not specifically mentioned below will also need to be included

1. **SCHEDULED PREVENTIVE MAINTENANCE** - Once a year a thorough preventive maintenance schedule will be performed including the following:

   A. Inspect coil, report condition.
   B. Inspect drain pan and drain line.
   C. Inspect fan wheels.
   D. Inspect drive sheaves.
   E. Replace belt annually **Regardless** of condition and **align** motor
   F. Lubricate as required.
   G. Check bearing and motor mounting.
   H. Check motor operating voltage and amperages. Record readings.
   I. Inspect Contactor for free operation
   J. Clean starter and cabinet
   K. Check diagnostic alarms and programming, if applicable.
   L. Inspect filters
   M. Check inlet vanes (where applicable) and dampers; adjust if necessary
   N. Meg compressor motor >10HP. Record resistance readings.
   O. Check VFDs (Adjustable Frequency Drives) if so equipped
   P. **Clean condenser and evaporator coils once per year.**
2. **SCHEDULED PREVENTATIVE MAINTENANCE** – 3 inspection(s) during the operating season in addition to the annual inspection will be made to include:
   K. Check coils
   L. Check condensate pans
   M. Check fan belt and tension
   N. Check motor
   O. Lubricate motor, if applicable
   P. Check fan assembly
   Q. Lubricate bearing, if applicable
   R. Check electrical connections
   S. Check controllers
   T. Check operation

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**PNEUMATIC TEMPERATURE CONTROL**

The following tasks are the minimum required services; any manufacturer recommended services not specifically mentioned below will also need to be included

1. **SCHEDULED PREVENTIVE MAINTENANCE** - Once a year a thorough preventive maintenance schedule will be performed including the following:

   A. Calibrate Major controls(Memorial Hall, Center for the Arts, Martin Luther, Walz Hall and Prosser Hall)
   B. Check System operating sequences
   C. Clean control Panel
   D. Check Control air pressure at each system and location of lowest main air pressure. Adjust main PRV at compressed air system if necessary.
   E. Visually check control valves for leaks
   F. Check time clock settings and night and day settings
   G. Inspect changeover control stations and record the mode system is in at time of inspection. Correct as necessary

**Compressor**

   A. Check compressor run time
   B. Open Compressor drain valve and bleed off any water accumulated in tank
   C. Check air compressor pressure and final system pressure Adjust PRV if necessary
   D. Inspect compressor belts, and safety valves.(replace belts annually)
   E. Replace oil within the compressor(annually)
   F. Clean compressor tank, compressor , PRV and after filter(replace filter annually)
   G. Clean and Inspect the operation of refrigerated after cooler.
   H. Inspect filter and oil indicators, if available, for contamination
   I. Follow manufacturers recommended procedures for any other desiccant in use with system
Scheduled Maintenance Requirements Attachment, A

GLYCOL SYSTEMS

The following tasks are the minimum required services; any manufacturer recommended services not specifically mentioned below will also need to be included

1. SCHEDULED PREVENTIVE MAINTENANCE - Once a year a thorough preventive maintenance schedule will be performed including the following.
   A. Inspect pump system operation and controls
   B. Clean electronic sensor
   C. Document fluid level
   D. Verify freeze point and document

DX COOLING SYSTEMS SYSTEMS

1. ANNUAL MAINTENANCE - Once a year a thorough preventive maintenance schedule will be performed including the following:
   A. Check unit charge, Leak check as required
   B. Detailed cleaning and inspection of condenser and evaporator.
   C. Check condition of compressor contactors for wear, pitting, etc.
   D. Check safety controls.
   E. Meg compressor motor (over 10 tons and Record readings).
   F. Check and tighten electrical connections.
   G. Tighten motor terminals and control panel terminals.
   H. Check crankcase heater and heater operation.
   I. Visually inspect condenser and evaporator fans.
   J. Check low ambient operation if applicable.
   K. Check diagnostic alarms and programming, if applicable.
   L. Report any deficiencies noted to customer.
   M. Inspect condensate drain or pump, and repair if applicable.