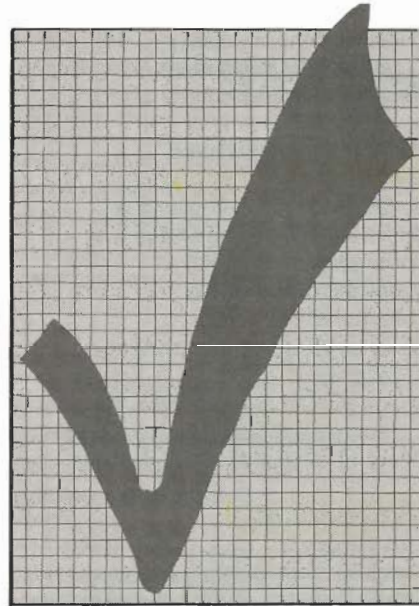
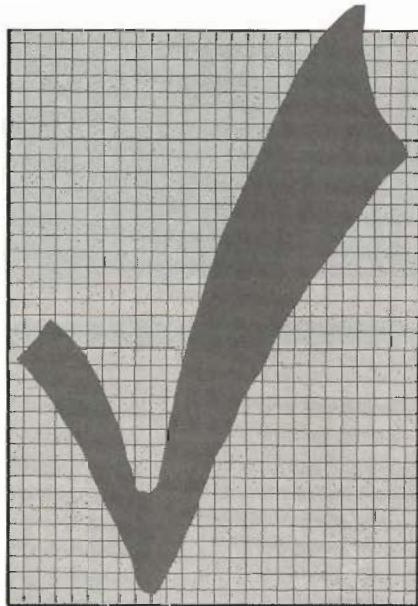
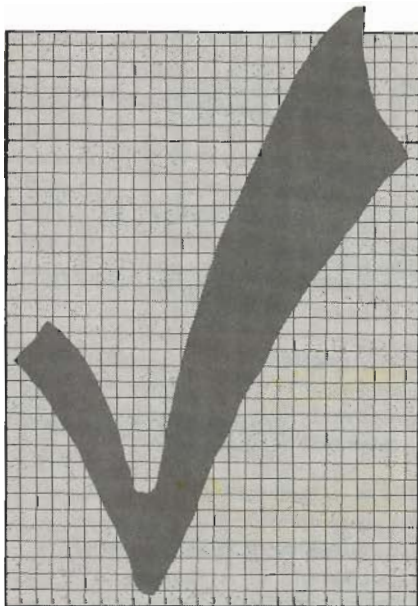


Heating up the heating season

A check list of maintenance tasks



BOILERS

- Check safety relief valve.
- Check combustion controls.
- Check piping and connections.
- Check lo-water cutoff.
- Check water make-up system.
- Check room air intake system.
- Check valves.
- Check water level gauges glass & controls.
- Disassemble lo-water cutoff.
- Clean lo-water cutoff.
- Check contacts.
- Check mercury bulbs.
- Check wiring.
- Reassemble lo-water cutoff.
- Clean internal surfaces (as required).
- Clean external surfaces (as required).
- Clean burner assembly.
- Clean make-up water.
- Clean hi-water.
- Clean fireside.
- Clean flues.
- Inspect refractory.
- Blowdown mud legs.
- Blowdown gauge glass.
- Blowdown feeder cutoff switch (steam).
- Prepare machine for winter conditions.
- Log machine condition at departure.

Electric boilers

- Check magnetic contactors.
- Check pressure control.

- Check hi-limit switch.
- Check step controller.

Oil boilers

- Check burner operation.
- Check burner control system.
- Check fuel pump.
- Check fuel valves (for tight seating).
- Check oil heater(s).
- Check tank heater.
- Check fluid system.
- Check fuel leaks.
- Check linkage.
- Check flame detection.
- Check flue gas temp and content.

Gas boilers

- Check burner operation.
- Check gas booster.
- Check gas regulator.
- Check linkage.
- Check gas leaks.
- Check gas safety switch.
- Check gas valves (for tight seating).
- Check flue gas temp and content.

Steam boilers

- Check condensate float valve.
- Check condensate return pumps.
- Check condensate tank.
- Check pumps.
- Check gas safety switches.
- Check pressure controls.

- Check draft fans/switches.

Hot water boilers

- Check circulating pump system.
- Check water cutoff.
- Check water feeder.
- Check shutoff valves.
- Check temperature controls.
- Check draft system.

AUTOMATIC TEMPERATURE CONTROLS

Air compressor

- Drain tank and check traps.
- Change oil and check oil pressure.
- Check belt and sheaves and change as required.
- Change suction filter as required.
- Check unloader and check valve.
- Check high pressure safety valve.
- Check motor operating conditions and lubricate.
- Check PE switch, starter and alternator.
- Clean and paint as required.

Refrigerated air dryer

- Check refrigerant pressure (33 lbs).
- Check refrigerant temperature (35°F).
- Clean condenser and cover grills.
- Check drain trap and bypass valves.

Filter and pressure reducing station

Check particle filters (change as required).
Check oil filter (change as required).
Check pressure reducing valve settings.
Check low pressure safety valve.

Boiler

Calibrate all controllers.
Calibrate all transmitter and receiver gauges.
Check all PE switches.
Check all control valves.
Check all pilot positioners.
Check all auxiliary control devices.

Fan systems and hvac unit controls

Review sequence of operation.
Check all dampers and lubricate.
Check pilot positioners.
Check all control valves.
Calibrate all controllers.
Calibrate all transmitters and receiver gauges.
Check all solenoid air valves, PE switches and air valves.
Check all auxiliary control devices.

Room-terminal unit controls

Check all room stats.
Check operation of unit coil steam traps.

WATER TREATMENT

Open steam boilers

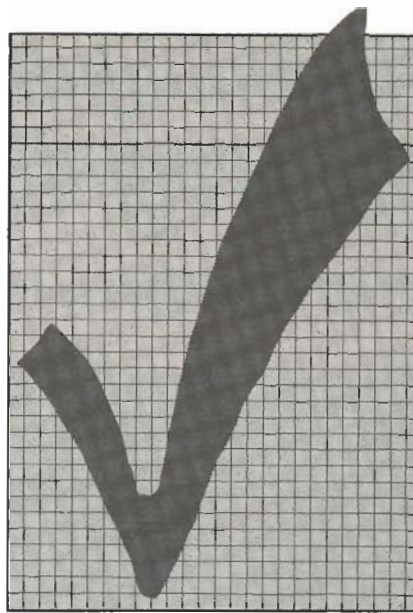
Operate all chemical bleed and feed equipment to assure proper operation.
Chemically test the system water for proper bleed rate and treatment levels.
Adjust controls to achieve proper operation.
Furnish a written report of the test and inspection results including recommendations.
Inventory the remaining water treatment chemicals supply and re-order as required.

Closed systems

Chemically test the system water for proper treatment levels.
Adjust the treatment level for proper operation.
Furnish a written report of the test and inspection results including recommendations.
Inventory the remaining water treatment chemicals supply and re-order as required.

FANS & CENTRAL FAN SYSTEMS

Check and clean fan assembly.
Lubricate fan bearings per manufacturer's recommendations.
Lubricate motor bearings per manufacturer's recommendations.



Check belts and sheaves. (Replace and adjust as required.)
Tighten all nuts and bolts.
Check motor mounts and vibration pads. (Replace and adjust as required.)
Check motor operating conditions.
Inspect electrical connections and contactors.
Lubricate and adjust associated dampers and linkage.
Check fan operation.
Check and clean drains and drain pans.
Check and clean strainers, check steam traps and hand valves.
Check filter advancing mechanism.
Lubricate and adjust as required.
Inspect filters.
Check heating coils.
Inspect humidifier.

ASSOCIATED EQUIPMENT

Unit ventilator

Brush and vacuum grills, coil, fan and unit interior.
Lubricate fan and motor bearings per manufacturer's recommendations.
Check belt and sheaves. Replace and adjust as required.
Check and clean drains and drain pan.
Check and clean strainers. Check steam traps and hand valves.
Inspect filters.
Check unit operating conditions.
Lubricate and adjust dampers and linkage.
Clean and paint exterior surfaces as required.

Fan coils/unit heaters

Brush and vacuum coil, fan and housing as required.

Lubricate fan and motor bearings per manufacturer's recommendations.
Check belt and sheaves. Replace and adjust as required.
Check and clean strainers. Check steam traps and hand valves.
Inspect electrical connections, contactors; relays and operating/safety controls.
Check unit operation. Adjust as required.

Radiation

Visually inspect fins/cast iron. Clean as required.
Check and clean strainers. Check steam traps and hand valves.

Induction units

Visually inspect coil. Clean as required.
Check and clean drains and drain pans.
Clean discharge grill.
Check and clean strainers. Check steam traps and hand valves.

Reheat coils

Visually inspect coil. Clean as required.
Check and clean strainers. Check steam traps and hand valves.

Boxes—dual duct and variable air volume

Inspect box for duct work connection.
Lubricate and adjust dampers and linkage.

HVAC EQUIPMENT

Visually check for leaks. Tighten connections.
Verify pressure gauge and thermometer accuracy.
Check and clean strainers. Check steam traps and hand valves.
Check operating safety devices.

Humidifiers

Check and clean strainers. Check steam trap and hand valves.
Clean and check float assembly.
Check and clean drains and drain pan.
Clean heating element.
Inspect electrical connections, relays, contactors and operating and safety controls.
Clean plugged spray nozzles.
Check unit operating conditions.

Steam PRV

Verify accuracy of gauges.
Check unit operation and lubricate as required.

UNITARY EQUIPMENT HEATING

Steam, hot water, electric, gas or oil burner

Lubricate fan bearings per

manufacturer's recommendation.
 Lubricate motor bearings per manufacturer's recommendation.
 Check belts and sheaves. Replace and adjust as required.
 Check cooling coil, clean and straighten fins as required.
 Lubricate and adjust dampers and linkages.
 Check and clean drain pan and drains.
 Inspect filters.
 Check motor operating conditions.
 Inspect electrical connections, contactors, relays and operating/safety controls.
 Check and clean strainers and check hand valves.
 Secure unit panels and inspect roof curb flashing.
 Inspect, clean and lubricate the burner and combustion control equipment.
 Check burner sequence of operation and combustion air equipment.

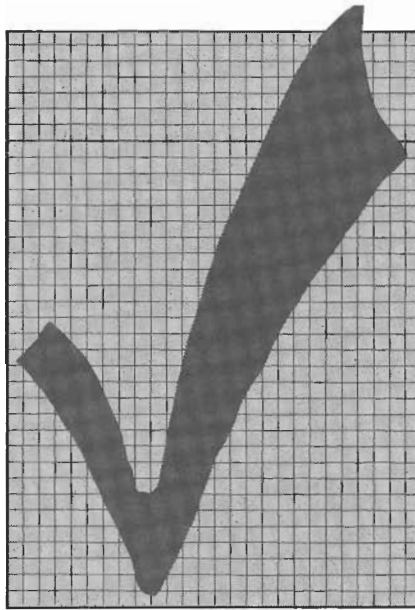
END-OF-SEASON AIR CONDITIONING CHECKLIST

Refrigeration systems-general

Pump down refrigeration system (if no longer required).
 Close inlet and outlet valves.
 Check vessel connections for leaks.
 Check condenser and receiver relief valves for leaks.
 Disconnect power supply to the control circuit.
 Tag "off season".
 Check refrigeration system and piping for possible repairs.
 Calibrate pressure gauges and thermometers.
 Check safety controls for proper setting and operation.
 Clean and tighten electrical connections.
 Lab test lithium bromide and refrigerant water samples.

Compressors and motors

Schedule full or partial dismantling of the compressor.
 Check valve wear.
 Check bearing wear.
 Check for misalignment.
 Drain, check and clean oil reservoir.
 Change oil filters, clean strainers.
 Take oil sample for laboratory analysis.
 Check oil heaters and controls.
 Check thrust bearing end-clearance and record.
 Inspect inlet damper mechanisms for cracks and wear.
 Clean all sight glasses.
 Overhaul purge unit.
 Change oil in speed increaser gear sets.
 Check open drive motor couplings for



wear and alignment.
 Clean motor windings and lubricate bearings.
 Cover motors subject to air borne contaminants.

Heat transfer surfaces

Blow air through condenser to remove trapped water.
 Circulate anti-freeze solution through condenser and water piping.
 Remove condenser heads and clean tubes.
 Inspect condensers for signs of corrosion.
 Evaluate water treatment.

Cooling towers

Disassemble, clean, reassemble float and ball-cock valves.
 Wash down interior of the cooling tower.
 Clean perforated head pans and spray nozzles.
 Drain and flush tower pans.
 Drain and flush pipelines.
 Drain and flush pumps.
 Lock closed automatic "fill" valves.
 Remove and clean strainers and screens.
 Inspect tower fans and drives for wear, cracking and corrosion.
 Cover fan and louver openings subject to airborne dirt.
 Check pump motor bearings and lubricate.
 Paint all metal parts subject to alternate wetting and drying.

Air cooled condensers

Clean, inspect and cover air cooled condensers.
 Clean and check fan blades.
 Inspect and lubricate fan bearings.
 Loosen fan belts or remove.

Air handling coils

Drain and flush coils with anti-freeze solution.
 Clean coil face.
 Clean condensate traps.
 Clean and drain pans.
 Check and calibrate freeze stat controls in air ducts.
 Install freeze alarms in ducts.

FREEZING WEATHER CHECKLIST

Boiler and piping

Drain and blow out all idle equipment.
 Check service water lines for possible freezing.
 Replace damaged insulation.
 Check tracing around control lines and transmitter boxes.
 Check all steam traps for proper function.

Compressor air systems

Check air driers.
 Drain air tanks.
 Check aftercoolers and intercoolers.
 Drain, blow out, and flush with glycol all idle compressor jackets.

Air conditioning and refrigerating systems

Drain, blow out, and flush all seasonal equipment, condenser lines, tubing and piping.
 Check all outside dampers.
 Cut back cooling tower fan speeds.


Pressure vessel vents

Correct low spots in long runs.
 Drain loops and bends.
 Enlarge vent diameters at point of outside discharge.
 Protect vessel vents from ice or snow accumulation.

Relief valves

Protect against snow or ice accumulation.
 Clear relief valve body drains.
 Protect valve discs from freezing shut.
 Relocate relief valves to heated areas whenever possible.

Mechanical equipment

Drain all idle pumps and compressors.
 Make sure jackets are vented.
 Provide proper lubrication for cold weather operation.
 Provide heated enclosures around operating equipment wherever possible.
 Install no-flow switches and alarms in cooling water lines. 

EDITOR'S NOTE: The preceding information was supplied by Johnson Controls Inc., Milwaukee, WI.