

## Preventative Maintenance for Heating, Cooling and Refrigeration Systems

What is it and why it is important?

Preventative maintenance is a planned activity to clean, inspect, and test heating, cooling, and refrigeration equipment to ensure they run efficiently, reliably, and have a long service life. Most businesses practice reactive maintenance or “run it till it breaks” which has low upfront costs but will ultimately degrade equipment performance and reliability. Over 50% of business owners still operate with a philosophy of reactive maintenance.

The Basics:

- Replace all filters quarterly
- Inspect and clean evaporator and condenser coils quarterly
- Inspect and lubricate fan motors quarterly
- Replace all belts annually
- 30 Point Maintenance Check (see attached list)

Special Issues:

Thermostat Settings. Programmable thermostats can be confusing so if there are any questions these should be checked out. A lot of energy is wasted by not having the units “set back” when the building is unoccupied. Settings should be checked and adjusted to prevent excessive run-time, maintain comfortable conditions during occupied hours, and achieve the maximum practical setback/setup during unoccupied hours.

Economizer Damper Controls. These controls provide excellent energy savings. If operating properly they can save at least 10% of operating costs of the unit. However, if they are not inspected and tested at least twice a year there is a chance they might not be working properly. About half of all newly installed economizers don’t work properly. If they are not working properly they can waste more energy than they save.

References:

1. **Energy-Efficient Operations and Maintenance Strategies for Packaged HVAC Systems.** This article, written in 1997, provides an excellent and easy to read overview of why preventative maintenance is important for Packaged Heating Ventilating and Air Conditioning (HVAC) equipment. The article provides step-by-step guidance and even estimates on energy savings.  
<http://www.ductpro.com/Downloads/PGE%20Study%20-%20Coil%20Cleaning.pdf>
2. **EERE Preventative Maintenance Guidelines.** This article explains the difference between reactive and preventative maintenance approaches. While reactive maintenance has less upfront costs it certainly costs more in the long run. This article puts it in good perspective and makes a good case for investing in preventative maintenance.  
[http://www1.eere.energy.gov/femp/pdfs/OM\\_5.pdf](http://www1.eere.energy.gov/femp/pdfs/OM_5.pdf)
3. **HVAC: Economizers.** This article explains how economizers work, the energy saving benefits of using them, and the importance of inspecting their operation on a regular basis.  
[http://www.reliant.com/en\\_US/Platts/PDF/P\\_PA\\_8.pdf](http://www.reliant.com/en_US/Platts/PDF/P_PA_8.pdf)

### ***30 Point Check List***

<input type="checkbox"/>	Check system for proper refrigerant charge
<input type="checkbox"/>	Check compressor amps
<input type="checkbox"/>	Check condenser fan amps
<input type="checkbox"/>	Check condenser coil
<input type="checkbox"/>	Check contactor points
<input type="checkbox"/>	Check capacitor
<input type="checkbox"/>	Check thermostat (level)
<input type="checkbox"/>	Check thermostat calibration
<input type="checkbox"/>	Check temperature split at evaporator coil
<input type="checkbox"/>	Check blower amps
<input type="checkbox"/>	Check heat strip amps
<input type="checkbox"/>	Check safety controls
<input type="checkbox"/>	Check all electrical connections
<input type="checkbox"/>	Check air circulation
<input type="checkbox"/>	Check for air leaks at plenum
<input type="checkbox"/>	Check all visual leaks
<input type="checkbox"/>	Change filter if available
<input type="checkbox"/>	Lubricate all moving parts where necessary
<input type="checkbox"/>	Check and clean evaporator coil
<input type="checkbox"/>	Flush or blowout condensate line
<input type="checkbox"/>	Check for excessive vibration
<input type="checkbox"/>	Level a/c condenser
<input type="checkbox"/>	Check defrost control
<input type="checkbox"/>	Clean, check & adjust condenser fan
<input type="checkbox"/>	Check condensing temperature split at condensing coil
<input type="checkbox"/>	Clean indoor blower
<input type="checkbox"/>	Check the crankcase heater
<input type="checkbox"/>	Check final performance