

# Predictive Maintenance

Reduce Building Operating Costs, Avoid Unexpected Downtime



## Identify and Correct Hidden HVAC System Problems

Your building's HVAC systems appear to be running fine...not many comfort complaints, energy costs keep inching up, but no clear signs of problems. But are your systems operating at maximum efficiency to minimize those energy costs? Are there hidden problems that could lead to costly repairs and downtime? Could there be indoor air quality problems? Have changes in the building configuration made system modifications necessary?

The longer your building's HVAC systems have been in service, the greater the probability that your operating costs are higher than they should be. Fortunately, there's an easy, cost-effective solution: Predictive Maintenance by Carrier.

When system components unexpectedly fail, you face costly downtime and inconvenienced occupants. With Carrier Predictive Maintenance, you'll identify potential problems prior to breakdowns and proactively schedule repairs at times that won't inconvenience you or your building's occupants.

We invest in the the most advanced analysis tools for comprehensive and accurate building system evaluation. This allows us to discover or rule out virtually any hidden HVAC system problem. So when you choose Carrier for evaluation, you do so knowing you can trust the results.

Carrier also uses the latest educational technologies and proven educational design to assure that we have the most highly trained personnel. We keep all our technicians current on the latest systems testing technology.

### Predictive Maintenance Benefits

- Identify and correct minor problems inexpensively, before they lead to more complex and expensive repairs
- Avoid needless downtime
- Minimize any inconvenience to occupants
- Ensure continued production in process applications
- Control energy costs
- Prolong equipment life, deferring replacement expense
- Prevent overtime costs for unscheduled repairs

# Predictive Maintenance

## A Full Range of Testing Keeps You Informed

Carrier Predictive Maintenance is strategic to optimal building systems management. With it, you will make the most informed decisions and achieve the lowest overall operating costs.

## Building Survey and Analysis



We start with a comprehensive inspection and analysis of the current condition of your building's envelope, HVAC system components, controls, and more. We then compare the current performance of these components to their original design conditions. Recommendations to improve the operating efficiency of the system based upon current operating needs and conditions.

## Vibration Analysis



Analyzing the vibration in rotating components of any machine can provide a remarkably detailed picture of many different mechanical problems, even at the early stages in their development. And vibration signatures are extremely valuable for future comparison and analysis. If the signature changes over time, it can reveal wear or impending failure.

## Thermographic Testing



With heat-sensing scanners and imaging equipment, we'll detect any abnormal temperatures or heat build up in your mechanical systems. If present, they're signs that a system has problems. Our thermographic analysis will quickly spot the overly high operating temperatures that are the principal cause of costly motor winding failure. This testing is a powerful tool for early problem identification and avoidance of potential breakdowns.

## Eddy Current Testing



areas and other tube defects.

An inspection probe, inserted in a heat exchanger tube, creates a magnetic field which causes electrical disturbances in the tube — eddy currents. Expert computer analysis of those currents can reveal and identify pits, cracks, gouges, bulges, worn

## Chiller Tube and Fluid Analysis



all fluids in the chiller: refrigerant, oil, water, or lithium bromide.

We'll remove tubes to take precise interior and exterior measurements, sample tube scale, and conduct a corrosion evaluation. Our metallurgical analysis will spot and identify any metal deterioration. Our laboratory chemical analysis will determine the condition of

## Motor Insulation Testing

Regular motor insulation testing identifies insulation deterioration before failure occurs, permitting budgeted, scheduled repair. We use meg-ohm testing to evaluate the condition of electric motors in your systems without labor-intensive disassembly. Our testing will reveal any weak spots in motor windings or the presence of potentially damaging moisture. Both indicate winding insulation deterioration. We'll also evaluate starters and connecting wire insulation.

## An Invaluable Database on Your Facility

We maintain a complete database of all tests and results performed on your building's systems. This record is an essential tool to help optimize operation and identify any developing problems — a key component of predictive maintenance.

*For more information about our Carrier's Predictive Maintenance, contact your local Carrier representative or go to: [www.commercial.carrier.com](http://www.commercial.carrier.com)*

