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AIRE Bulletin

Commercial Leak Detection Sensors

Water damage remains one of the most frequent and costly sources of property loss across commercial occupancies. Undetected leaks can escalate quickly – damaging equipment, interrupting operations, and increasing total loss severity. Leak detection technologies provide an effective early warning layer that supports faster response, improved loss outcomes, and stronger overall risk quality.

Please note – from a risk engineering perspective, leak detection should be viewed as part of a broader water damage prevention strategy, not a standalone solution.

This guide outlines key considerations for evaluating and implementing commercial leak detection solutions across a property or portfolio.

Defining the Objective

Before selecting technology, it is important to clearly define the problem your organization is looking to solve. Common objectives include:

- Identifying high severity leaks
- Reducing number of water damage events
- Protecting critical areas
- Fulfilling insurance company recommendations

A well-defined objective helps ensure the system design aligns with operational priorities and budget constraints.

Financial Considerations and Value

Leak detection systems require upfront investment, but cost should be evaluated in the context of opportunity cost over time. For example, a single prevented major water loss can offset years of system cost. Many organizations also start with coverage limited to critical areas and expand over time. Evaluating costs over a multiyear horizon often provides a clearer picture of return on investment than initial installation cost alone.

Point and Area Water Sensors

These devices detect the presence of moisture and trigger alerts when water is encountered. They are the most basic, yet often the most effective form of leak detection technology. Able to identify leaks from internal or external sources of water intrusion, they are customizable and multiple different options exist – they are available in spot-sensor, or extended cable/rope configurations for wrapping around equipment or running along walls.

These are best used where early notification is critical, even if the source is not immediately identified

Automatic Water Shutoff

When paired with sensors or flow monitors, automated shutoff valves can isolate water supply upon leak detection to reduce duration and severity of active leaks. As with the water flow monitoring, these valves are most effective when zoning aligns with building layout and critical functions. However, careful planning is required to avoid unintended operational disruption.

Prioritizing Sensor Locations

When more comprehensive coverage is not immediately feasible, prioritization is key. Consider the following factors:

- Asset criticality
  - Electrical rooms, IT spaces, and high value equipment areas
- Operational dependency
  - Areas where downtime would significantly impact business continuity
- Leak probability
  - Mechanical rooms, water-using equipment, domestic water infrastructure
- Vertical exposure
  - Equipment or piping located above sensitive spaces
- Occupancy and visibility
  - Low traffic areas may benefit most from automated detection

A risk-based placement strategy maximizes benefits even with limited deployment.

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Response Planning and Staff Awareness

Technology alone does not prevent losses – effective response does.

It is critical to have a formal plan in place and to make sure that staff is trained on the contents of that plan (immediate response actions, location of manual shutoffs, and escalation and notification protocols). All staff should know the procedures and response protocols.

Even regular or ancillary vendors should be aware of the presence of leak detection technology – security or after–hour personnel, third-party monitoring services (if applicable), housekeeping personnel, etc.

Selecting a Vendor

When evaluating vendors, consider the following:

- **Scalability:** Depending on the goals for implementing this technology, the ability to expand from sensors to flow monitoring or shutoff capabilities may be a factor. Some vendors provide a full suite of options, while others only provide leak detection sensors.
- **Device communication method:** Based on the building construction and layout, devices may require different communication methods. Wi-Fi, cellular, Bluetooth, and radio frequencies are all options, but a concrete basement, for example, might result in difficulties with devices using a cellular signal for communication.
- **System integration:** Consider if existing building management or monitoring platforms with the recent technology are compatible.
- **Experience:** Ensure that the vendor you choose is familiar with your occupancy type and geographic footprint.
- **Service support:** Having a local or regional vendor can drastically improve response times and technical resources.

Vendor alignment with both technical and operational needs is critical to long-term success.

Final Considerations

Water leak detection systems are one tool that can support water damage prevention efforts when thoughtfully selected, installed, and maintained. These systems are intended to provide early indication of potential water events; they do not prevent all leaks, nor do they eliminate the possibility of water damage.

Effectiveness depends on many factors, including system design, placement, monitoring, maintenance, and response procedures. Leak detection technology should be considered as part of a broader water damage risk management approach, rather than a standalone solution.

Arch Insurance Risk Engineers (AIRE) Bulletin

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