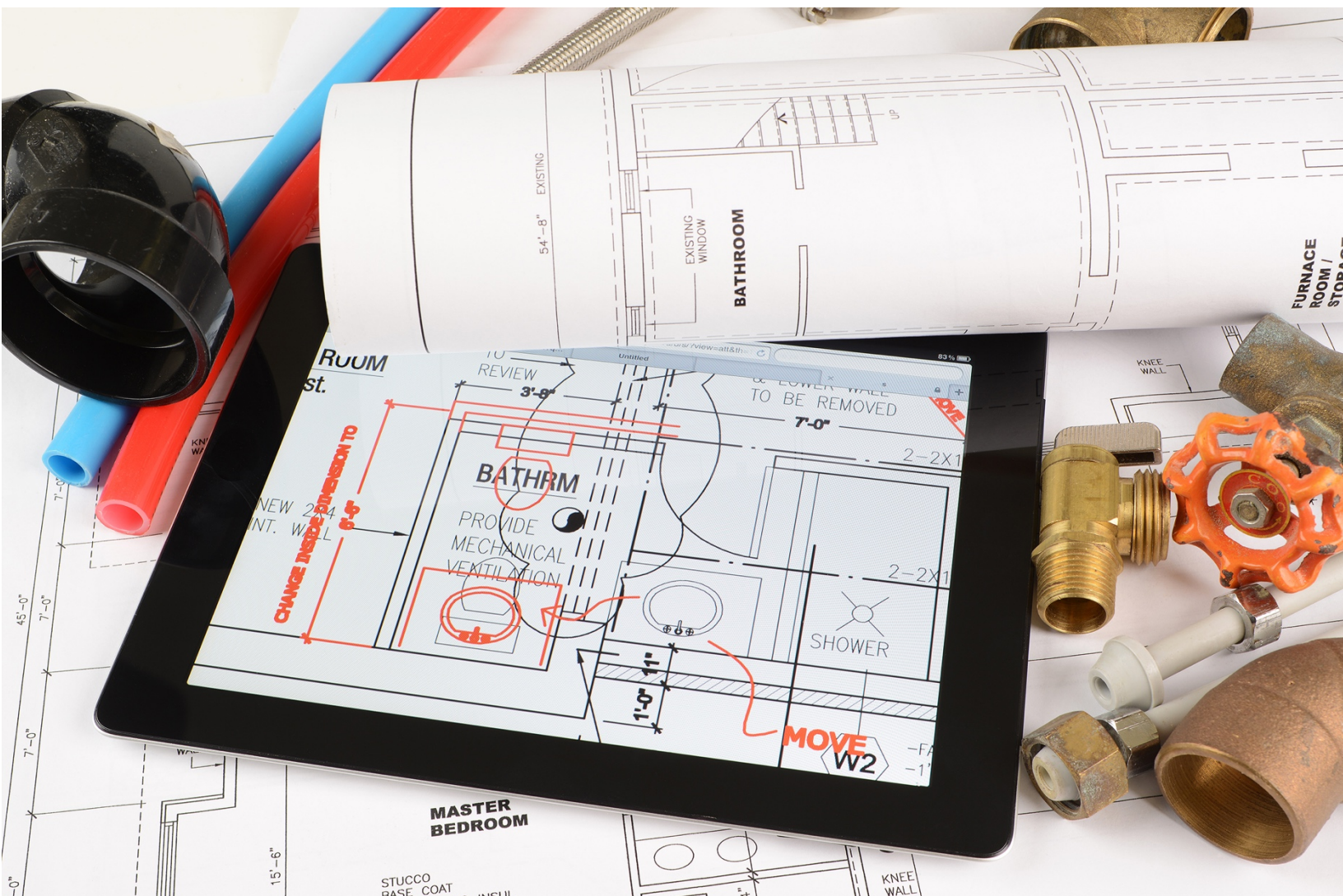


# Specifying Plumbing Leak Detection for Common-Risk Properties

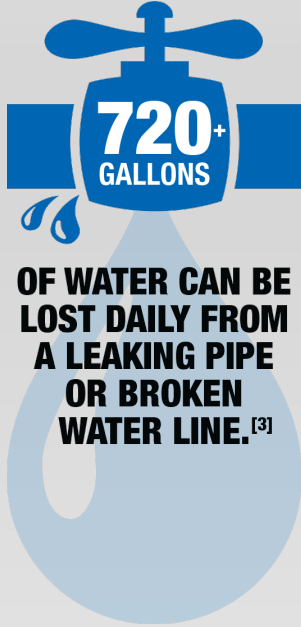
*Mitigating Water Damage in Residential & Commercial Properties*

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## Why Worry About Plumbing Leaks?

Plumbing leaks occur in buildings of all shapes and sizes every day — even those employing high-quality products and superior workmanship. Every building is at risk of water damage from undetected leaks. The key is to put systems in place to stop the uncontrolled water flow before the damage becomes catastrophic.

The statistics around the frequency and severity of water damage and related insurance claims are alarming. Here are just a few examples:

### *Commercial Properties:*

- In 2015, liquid damage was the leading cause of property losses in offices, apartments and other real estate facilities. 57% of all Zurich Real Estate claims were tied to water damage, accounting for 71% of total loss dollars. <sup>[1]</sup>
- Water damage leads to billions of dollars in structural, operational, reputational and financial losses each year for commercial property owners. <sup>[2]</sup>

### *Homeowner Properties:*

- From 2011 – 2015, the second most frequently occurring homeowner insurance claim was due to Water Damage and Freezing, with an average claim value of \$8,861. About one in 50 insured homes has a property damage claim caused by water damage or freezing each year. <sup>[4]</sup>
- From 2011 – 2015, 6.8 percent of insured homes had a claim, according to ISO. Water Damage and Freezing claims accounted for 45.1 percent of all homeowner losses in 2015. <sup>[4]</sup>

Beyond significant water loss and structural damage, water leaks can also destroy property such as electronics, carpeting, furniture and appliances. The loss of irreplaceable items such as old family photographs or prized collections can be particularly devastating.

Water damage can also lead to mold growth and potential health issues.



**3RD-FLOOR DENTAL  
OFFICE LEAK:**

**Est. Damage: \$110,000**

**UNREPORTED COLLEGE  
DORM LEAK:**

**Est. Damage: \$1.2 million**

In addition to property damage ranging from damaged inventory, furniture and equipment to lost records, extensive water leaks at a commercial or industrial building can lead to business interruption and reputational loss – severely impacting customer relationships for years to come.

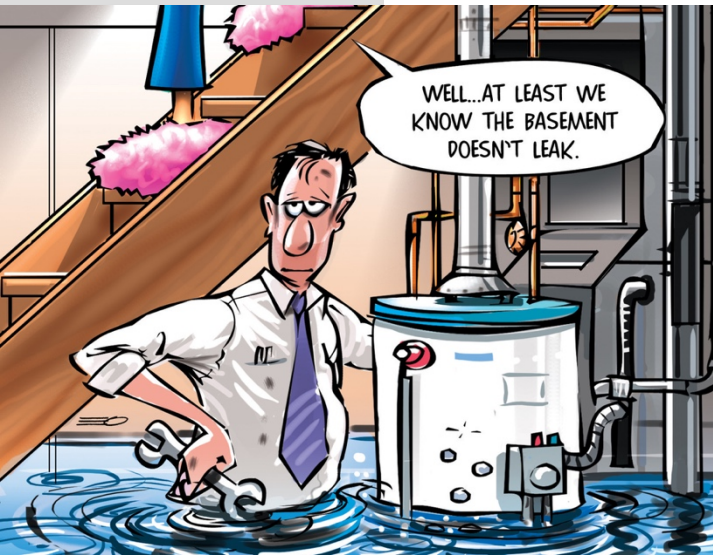
While water damage can be devastating in private standalone residences, it is compounded in common-risk properties such as residential or commercial high-rises, healthcare facilities and medical office buildings, where leaks can quickly spread into neighboring units and floors.

Imagine a dentist who opens his third-floor office Monday morning to find that water has been leaking undetected over the weekend. Below, on the second floor, partners of a law firm slosh through the debris of their board room and find a very expensive legal copier, several computers and irreplaceable legal documents and files all destroyed. Damage could be upwards of \$100,000.

Or, consider this scenario that seems like fiction, but really happened. A large-caliber handgun was accidentally discharged in a dorm room on an upper floor. The bullet passed through two adjoining rooms before penetrating a water pipe, causing a large-scale water leak that for some reason went unreported for an extended period of time as water ran down through several floors below. A huge, 7-figure clean-up bill and insurance claim could have been avoided by a leak detection system that would have shut off the water flow and immediately reported the leak to the maintenance department.

In a residential setting, in complexes where a large number of units were constructed at the same time, plumbing and water heater failures tend to run in batches. This can easily result in an insurance nightmare from successive claims. Multiple-unit insurance claims are also the norm when one unit's water leak quickly spreads to involve neighbors on all sides. The hassle of handling the cleanup, mold remediation and required repairs pales only in comparison to irate owners and tenants.





## Common Sources of Plumbing Leaks

Water damage in residential and commercial properties typically results from:

- Leaking pipes and plumbing fixtures
- Frozen pipes that burst
- Broken feed water lines on:
  - o Dishwashers
  - o Refrigerator ice makers and water dispensers
  - o Beverage dispensers
  - o Toilets
- Leaking hot water heaters – both tanks and tankless units
- Broken washing machine hoses
- Tenants forgetting to turn off bath water
- Cuspidors and tool feed lines in dental offices



## The Leak Detection Discussion: Who Needs to Know

Property owners, property managers and building contractors with an understanding of potential damage from water leaks are more likely to seek out a preventative solution before major issues arise.

Architects, consulting engineers and plumbing engineers should feel compelled to inform and educate their clients about plumbing leak detection and the solutions that are available to prevent or mitigate water damage in the event of a leak.

As part of a Whole Building Design approach, design professionals should incorporate leak detection products and systems into their concepts, designs and plans for new construction, build-outs and space renovations.

Plumbing leak detection and automatic water shut-off systems can benefit a wide range of stakeholders and facilities:

- High-end residential homeowners
- Property owners
- Property managers
- Business owners
- Maintenance managers: professional, commercial, corporate, municipal and industrial
- Medical facilities, including hospitals, doctor's offices, dentist's offices and dialysis centers
- Schools and colleges
- Corporate buildings and campuses
- Government and military facilities
- Risk managers

## Why Should You Specify Plumbing Leak Detection?

Plumbing leak detection offers many benefits in modern building plans and designs.

- Comply with local, state and federal zoning and building codes
- Mitigate potential water damage to structural property and personal property
- Minimize liability and avoid potential litigation from tenants, customers, etc.
- Minimize potential business interruption and lost revenue
- Avoid the hassle of insurance claims and costly deductible payments
- Comply with insurance mandates
- Benefit from insurance premium discounts or lower deductibles
- Comply with LEED and water conservation standards, as well as industry best practices



## What to Consider When Specifying

Leak detection is a simple concept, but it is by no means a one-size-fits-all deployment. Here are some key issues to consider:

- What pipe sizes, appliances and general plumbing layout do you need to monitor?
- What is the desired automated response in the event that a leak is detected?
  - o What type of notification is needed? Is a simple audible alarm sufficient, or does the property owner / tenant / building manager / etc. need to be notified via security system response, home automation/smart home system or automated phone call / text message?
  - o Should the water supply be shut down to the appliance, room, floor or entire building by closing supply valves? How long is a reasonable time to allow water to run before shut-off?
  - o Does a secondary device need to be controlled via relay output, e.g. turn off an AC unit, turn on a signal light or turn off a pump?
- What impact will there be on downstream users if the water is unexpectedly shut off?
- How many areas/appliances need to be monitored?
- Are those locations on multiple floors? In a single room? In a hidden plenum space that may warrant special consideration to comply with national electric codes?
- In the case of flow monitoring, what is the regular water use schedule/flow rate? Has there been an increase and, if so, was it anticipated?



## Types of Leak Detection Systems

Generally speaking, leak detection solutions can be broken down into four main categories:



### 1. Simple Battery-Operated Alarms

Low-cost audible water leak alarms are available commercially for less than \$10 a sensor. These devices are typically battery powered and can be placed just about anywhere. They work great, as long as the batteries are changed regularly and someone is present 24/7 to respond to the alarm.

*Pros: Lowest cost; flexible use/placement; easy to install*

*Cons: Minimal water damage mitigation benefits*

### 2. Simple Plug-In Alarms

One step up from battery-powered alarms are wall outlet-powered units, which often have dry contacts to tie into a building management system, home automation platform or text messaging service. These types of water sensor alarms still require someone to be on-hand to shut down the water feed to avert catastrophic damage. Unless on-board battery backup is available, these systems are vulnerable to power outages and can leave property unprotected. Because there is no proactive intervention, these types of systems are primarily used in low-risk facilities with around-the-clock security personnel who can respond fairly quickly to an emergency involving the building infrastructure.

*Pros: Lower cost; easy to install; output connectivity*

*Cons: Minimal water damage mitigation benefits*



### 3. Appliance-Based Systems

The true benefit of leak detection is realized with the integration of automatic water shut-off. Systems with out-of-the-box integrated valves allow for automatic water shutoff response to mitigate damage. These systems often come in task-specific configurations for appliances such as water heaters, washing

machines and HVAC overflow pans. Typically priced in the range of a few hundred dollars, these systems can easily pay for themselves by preventing just one plumbing leak from getting out of hand.

*Pros: Low cost; proactive shut-off of water supply*

*Cons: Less than 100% coverage, leaving some areas of the building exposed*



#### 4. Full-Facility Systems / Wireless Technology

Leak detection systems that can monitor multiple locations on floors throughout one building typically require some type of wireless communication, as the cost of running wires to every potential leak point throughout a large building can be cost prohibitive (if not physically impossible). While these systems are typically more expensive than those mentioned above, their capabilities certainly make them worthy of consideration.

Wireless systems often communicate by piggybacking on existing Wi-Fi infrastructure or through a closed-loop RF system. Many of these more advanced leak protection systems incorporate low-temperature detection into the water fault monitoring, thus protecting against frozen and burst pipes in geographic areas where freezing temperatures can be a concern. Most also provide on-board battery backup to ensure coverage during temporary power outages.

Obviously, a plumbing leak protection system can only work when it is deployed properly and the system remains intact. This is especially true with wireless technology, where sensors can be inadvertently knocked out of range. Ideally, the system should provide some form of positive confirmation or self-testing to indicate it is intact and fully operational.

*Pros: Proactive system monitoring and testing; “smart” capabilities; easy installation*

*Cons: Expense*

### *Additional factors and specification considerations:*

**Scalability:** Can the system accommodate future expansion?

**Flexibility:** Can the system accommodate different types of sensors where there are various physical/aesthetic considerations (such as hard-to-reach areas)? Can the system easily interface with building automation or home automation platforms?

**Technical Support:** Is the manufacturer or distributor able to provide installation, operation and ongoing support and troubleshooting?

**Installation:** How easy is the installation process? Are any special certifications, tools, skills or knowledge required?

**Reputation:** How long has the manufacturer been in business? Where are the components manufactured? Who are their supply chain partners?

**Detailed Product Information & Technical Resources:** Do you have easy, centralized access to specifications and other essential technical information from the vendor or manufacturer to make your job as easy as possible?

If this seems like a daunting task, it really shouldn't be. Any qualified manufacturer will be able to easily walk you through initial product selection.

## Cost Considerations

There are a variety of possible factors that should be considered when assessing the total cost of any leak protection system:

**Possible insurance premium discounts** – Many insurers will offer premium discounts or lower deductibles if a plumbing leak detection system is installed. In many cases, the system cost is actually less than the cost of the insurance deductible.

**Scalability** – A scalable system can provide the flexibility needed to accommodate incremental facility growth over time, not to mention cash flow considerations.

**Reputation risk** – Although insurance might cover a business interruption claim resulting from water damage, the insured may still be left with disappointed customers who seek out other suppliers or service providers as a result of the client's facility being inaccessible. Some customers may be permanently lost after such an event.

**Water conservation** – As mentioned previously, in addition to property damage, an undetected leak can result in a catastrophic, expensive loss of water.

**Peace of mind** – You and your client should consider the intangible value of knowing that the proper system is in place to detect and help protect against the devastating consequences of plumbing-related water damage.

**Installation expense** – Any system involving an automatic shut-off valve should be installed by a licensed plumbing contractor. This is typically a straightforward, inexpensive installation.

## Conclusion

Plumbing-related water leaks can happen at any time, even in the presence of the most meticulously designed and installed plumbing system. The damage caused by undetected leaks is unnecessary and can be substantially mitigated with the use of a plumbing leak protection system. Many insurance companies are not only rewarding customers who proactively install leak detection systems via reduced premiums, but they are also mandating a system be installed before a policy will be renewed following a water damage claim. Protect your clients' buildings and tenants' assets by specifying the right plumbing leak detection system as a standard feature of every new project and retrofit.

RDT has also published a companion Product Selection Guide to this white paper to provide engineers with a number of options for specifying the product that is best suited to the needs of their clients. For a copy of the companion guide, please send a request to [info@RelianceDetection.com](mailto:info@RelianceDetection.com) or [visit our website](#).

### *About Reliance Detection Technologies, LLC*

In an effort to address the ever-increasing demand for more sophisticated monitoring and detection capabilities from its FloodMaster® product line, Madison Company founded Reliance Detection Technologies, LLC (RDT) in early 2015. RDT's mission is to meet those increasing market demands by drawing on the depth and breadth of Madison Company's 55+ years of engineered sensor design and application experience. The first triumph of that mission is the newly released, state-of-the-art, RS-360 wireless system which combines low temperature / freezing pipe and water leak detection capabilities. [www.RelianceDetection.com](http://www.RelianceDetection.com)

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