

Mould risk detection

Finding the conditions for mould before the mould itself, with temperature and humidity monitoring.

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Mould is usually found when someone smells it, sees a stain or opens a wall after a leak. By then it has already grown, and the work is remediation rather than prevention.

The conditions that let mould grow can be measured long before that point. Temperature and relative humidity, read continuously where mould starts and turned into a risk indicator, let a building act while the problem is still only a risk: ventilate, heat or dehumidify when it is needed, and not the rest of the time.

Who this guide is for

This whitepaper is for property owners, housing companies, facility managers and building consultants who want to find and reduce mould risk in homes, offices, schools and service spaces. It explains what mould needs, how sensor data becomes a risk indicator, where to place sensors and how to act on the result.

It does not replace a moisture survey or professional remediation where mould is already present.

THE MAIN POINTS

- **Mould is a moisture problem first.** Sustained high relative humidity at a surface — not the room average — decides whether mould can grow.
- **Time matters as much as level.** A short peak is harmless; days of high humidity are not, and a surface needs a dry period before the risk has passed.
- **Measure where mould starts.** Cold exterior corners, basements, crawl spaces, attics and the wall behind a wardrobe say more than a sensor in the middle of a room.
- **Act on the risk, not on every reading.** Turn temperature and humidity into a risk state, then ventilate, heat or dehumidify only while it is needed.
- **Close the loop.** An alert helps only if someone owns it. Check that the risk clears after action, and treat a recurring pattern as a building fault.

1 Why mould matters

Health

The World Health Organization concludes that persistent dampness and microbial growth on interior surfaces and in building structures should be prevented or minimised, because they are associated with adverse health effects, particularly respiratory symptoms. It estimates that dampness affects 10 to 50 percent of indoor environments in Europe, North America, Australia, India and Japan. [1]

Buildings and budgets

Mould damages finishes and building materials, and removing it means opening surfaces, cleaning or replacing material and fixing the moisture source that caused it. The work is disruptive for residents and tenants, and the cost grows with the area affected. Preventing the conditions is cheaper than treating the result.

Traditional detection comes late

Musty odours, visible stains, water-damaged materials and periodic inspections all find mould that has already grown. Continuous monitoring finds the conditions, so the response can start before growth does.

2 What mould needs

Moisture is the deciding factor

Mould spores are present almost everywhere, and the nutrients they need are found in dust, wood, paper facings, wallpaper paste and many coatings. Most indoor temperatures are also suitable. Moisture is the factor that a building can control, so it is the one to measure.

Surface humidity differs from room humidity

The air in a room carries roughly the same amount of water vapour throughout, but a colder surface has a higher relative humidity than the air in the middle of the room. Exterior corners, thermal bridges, window reveals and walls behind furniture are therefore where mould usually appears first.

Building-physics design practice uses this directly: ISO 13788 sets a critical relative humidity at the internal surface, commonly 80 percent as a monthly mean, as the criterion for avoiding mould growth. [2]

Temperature and time

Growth is slow at low temperatures and faster in warmth, and it needs favourable conditions to last. Established mould-growth models, such as the one developed by Hukka and Viitanen, combine relative humidity, temperature, exposure time and material sensitivity, and allow for growth to stall or decline during dry periods. [3]

Materials differ

Wood, paper-faced boards and organic finishes are more sensitive than concrete, brick or glass. Even an inert surface can support growth on the dust layer that covers it, so the material lowers or raises the risk rather than removing it.

3 From measurements to a risk indicator

Two measurements, one question

A sensor measures temperature and relative humidity. The question the building needs answered is whether the surface is in a range where mould can grow, and for how long it has been there. A risk indicator turns the first into the second.

Risk now, and growth over time

A practical indicator has two parts. The first shows when conditions are in the mould-risk range right now. The second shows when they have stayed there long enough for growth to be likely, and it clears only after a drying period outside the risk range. A return to high humidity before the surface has dried resumes the risk rather than starting it again from zero.

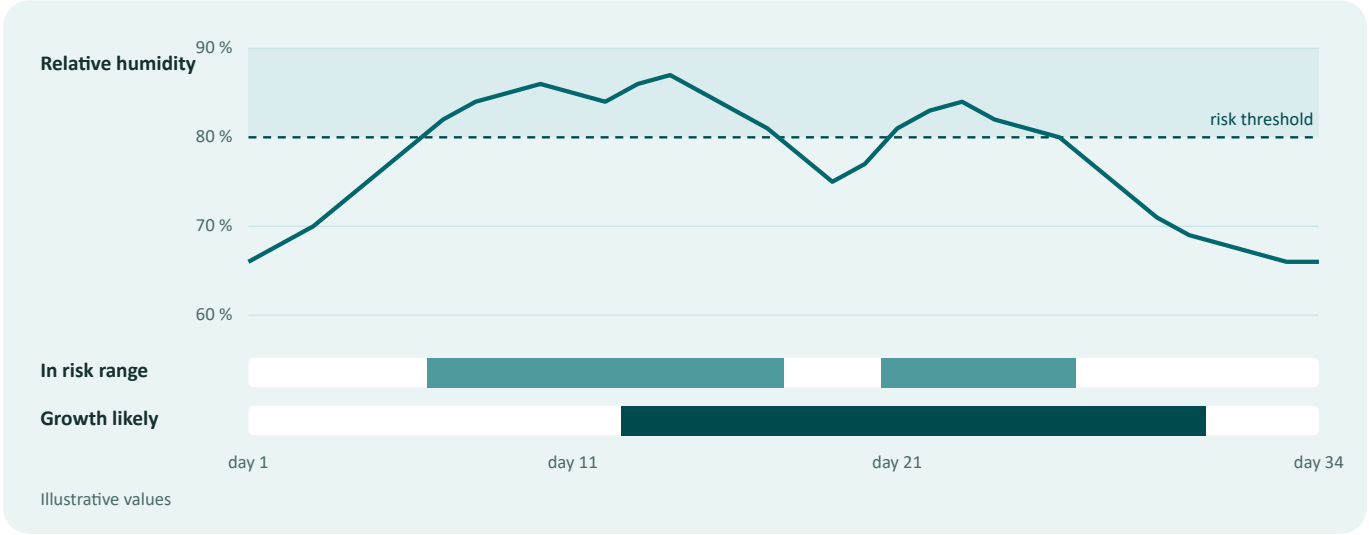


Figure 1. An illustrative month of relative humidity at a cold exterior corner. The risk state follows the humidity; the growth state starts only after sustained exposure and clears after a drying period. The thresholds and durations are illustrative, not product settings.

Use dew point as a cross-check

Dew point, calculated from temperature and relative humidity, shows how close a surface is to condensation. A surface that regularly reaches dew point has liquid water on it, which is a more acute problem than high humidity and usually points to a ventilation or insulation fault.

Accuracy matters near the threshold

Close to the critical humidity, a few percentage points decide whether a surface is in the risk range. Choose sensors with an accuracy of about ±2 % RH or better, check them against a reference at installation, and watch for drift over the years.

4 Place sensors where mould starts

The best location is the coldest or least-ventilated surface in the space, not the most convenient one.

- Exterior corners, thermal bridges and window reveals.
- Exterior walls behind wardrobes, beds, bookcases and stored goods.
- Basements and crawl spaces, especially where warm summer air meets cool surfaces.
- Attics and cold roof spaces.
- Bathrooms, laundry rooms and other spaces with high moisture loads.
- Storerooms and plant rooms with little air movement.

Measure close to the surface

A thin sensor mounted directly on the wall reads conditions much closer to the surface than a room sensor on a shelf. Keep it away from direct sun, radiators and supply-air vents, which make a corner look drier or warmer than it is.

Add a reference

A sensor in the room air of the same space, and outdoor conditions from a weather service or an outdoor sensor, help separate the causes: a high moisture load, too little ventilation or a surface that is simply too cold.

Check the radio path

Basements, crawl spaces and cold roofs are also difficult places for radio. Verify coverage at the final mounting position before relying on the data; the companion whitepaper on LoRaWAN networks covers how. [4]

5 Act on the risk

Give every alert an owner

Decide who receives a risk alert, by email, SMS or in a work-order system, and what they are expected to do. Escalate if the risk persists after a set time, and record what was done.

Ventilate and heat on demand

The risk state can start ventilation, a dehumidifier or a small increase in heating, and stop it again when the space is out of the risk range. This addresses the risk without running equipment more than necessary, which saves energy compared with continuous operation.

Find the cause

A risk that returns in the same place is a building fault, not a weather event. Common causes are leaks, blocked or undersized ventilation, laundry dried indoors, missing insulation and air leakage that cools a surface. Fix the cause, then confirm with the data that the pattern has stopped.

When mould is already present

Monitoring does not remove existing mould. Where growth is visible or suspected, use a qualified professional to assess and remediate it, and fix the moisture source first. Keep the sensors in place afterwards to confirm that the space stays dry.

6 Operate the monitoring

- Alert on missing reports as well as on risk, so a silent sensor is not mistaken for a dry space.
- Review the thresholds and alert rules after the first full season, using what the data showed.
- Expect seasonal patterns: unheated spaces in autumn and spring, and basements ventilated with warm, humid summer air.
- Track battery condition and plan replacements before sensors stop reporting.
- Keep a record of alerts, actions and results, so recurring problems become visible.

WHERE SENSATIVE FITS

- **Strips Comfort on the surface.** Under 3 mm thin and adhesive-mounted, Strips Comfort sits on the wall where moisture builds — along a skirting board, in a window reveal or behind furniture — and measures temperature (±0.2 °C), humidity (±1.8 % RH) and light for up to ten years.
- **Square Comfort for rooms and plant spaces.** The same accuracy, with built-in data memory and a larger battery for the most demanding reporting profiles.
- **Mould risk in Yggio.** Yggio, the open operational layer, turns Strips Comfort readings into mould-risk and mould-growth indicators, shows them as graphs, and its rule engine sends an alert by email or SMS — or a command over MQTT or HTTP to start ventilation — when the risk appears or a report is missed.

7 References

[1] World Health Organization. WHO guidelines for indoor air quality: dampness and mould. Copenhagen: WHO Regional Office for Europe, 2009.
www.who.int/publications/i/item/9789289041683

[2] ISO 13788:2012. Hygrothermal performance of building components and building elements — Internal surface temperature to avoid critical surface humidity and interstitial condensation — Calculation methods.
www.iso.org/standard/51615.html

[3] Hukka, A. and Viitanen, H. A mathematical model of mould growth on wooden material. Wood Science and Technology 33, 475–485 (1999).
doi.org/10.1007/s002260050131

[4] Sensative. Building quality LoRaWAN networks for longer sensor battery life. Whitepaper, 2026.
sensative.com/assets/downloads/building-quality-lorawan-networks-battery-life.pdf

For help with sensor placement, mould-risk monitoring in Yggio or radio coverage in difficult spaces, contact Sensative support at sensative.com/support.html or support@sensative.com.