When walls start to weep

Condensation and mould: finally understanding the winter ailment — and tackling it at the root

A few weeks ago, we recalled that a building's envelope works all year round, not only in summer. Among the benefits mentioned: the end of damp patches and mould linked to cold spots. So let us go into the detail — because behind the condensation on the windows and the corners that turn black lies a precise mechanism, and an equally precise solution. A particularly sensitive subject in our schools, gyms and public buildings, often old and densely occupied.

By Joël Kohli, Founder & Director



Condensation and mould are not inevitable: they are the symptom of a wall that is too cold. Warm the surface, and the wall stops weeping.

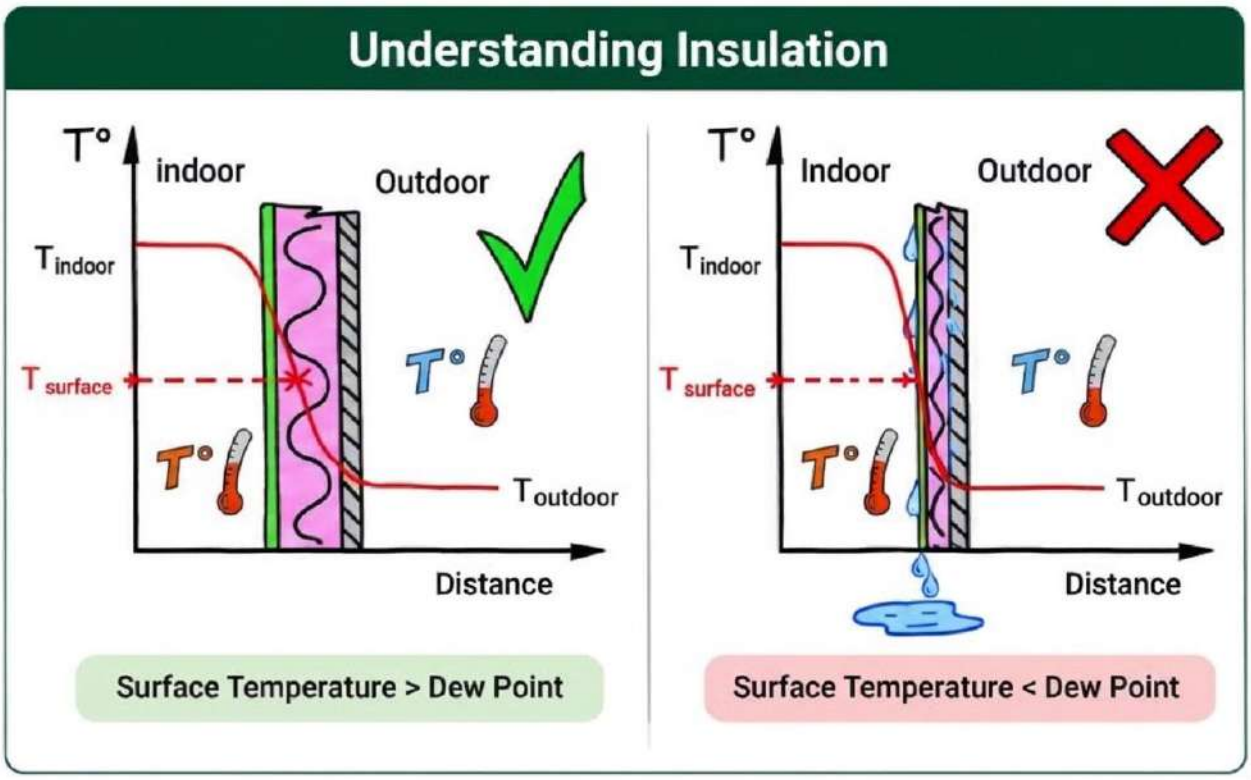
A reminder: the envelope works in winter too

Our faithful readers will remember: we showed that one and the same envelope treatment acts in summer and winter alike — reflecting the heat outside in summer, retaining the heat and treating air-tightness inside in winter. We then cited, among the benefits, the disappearance of damp patches and mould. That benefit deserved more than a single line: here is how it works.

Why a wall “weeps”

The phenomenon is purely physical, and there is nothing mysterious about it. Warm air contains water vapour — all the more so as it is warm. When this air meets a cold surface, it cools locally; below a certain temperature, known as the **dew point**, it can no longer hold all its moisture, which settles as droplets. That is condensation: on a pane, on a wall corner, on a window reveal.

The dew point depends on the room's temperature and humidity. In a room heated to 20 °C with 60% humidity, it sits around **12 °C**. In other words: any surface whose temperature drops below ~12 °C becomes covered with water. And a surface that stays damp for long is the ideal ground for mould — which proliferates as soon as surface humidity stays above 80% for a sustained period.

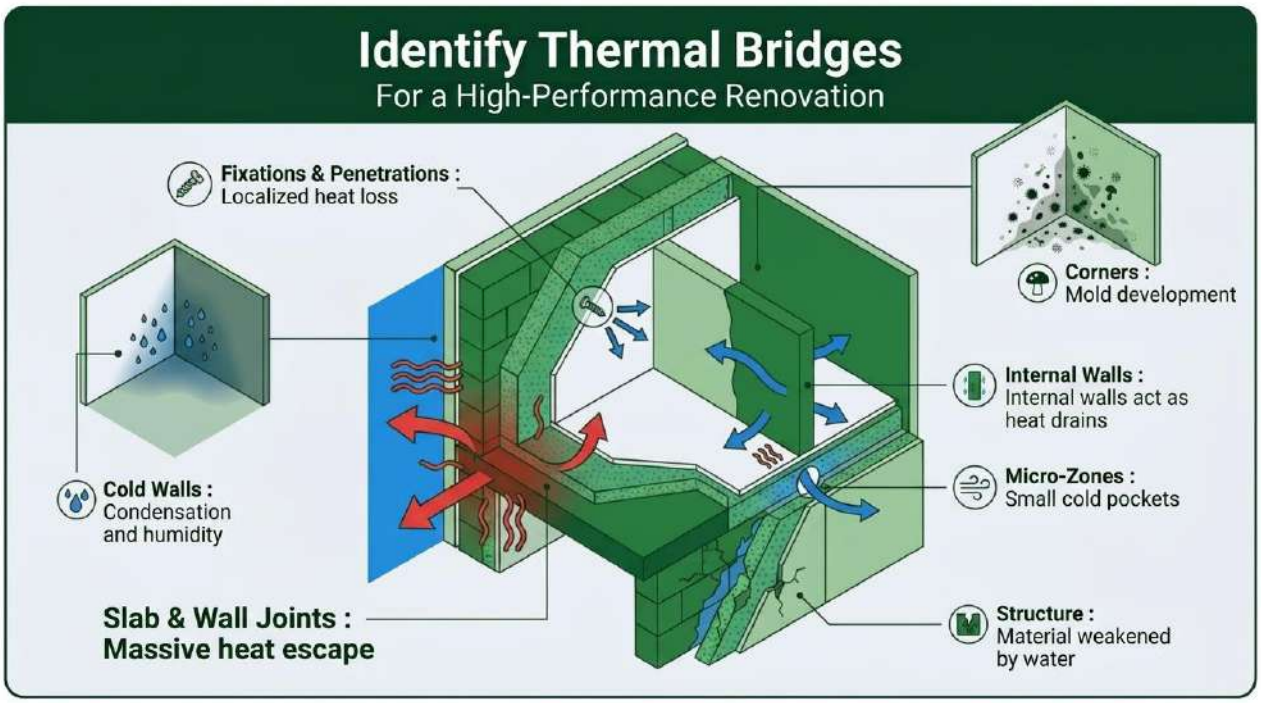


The mechanism is purely physical: warm, humid air cools on contact with a cold surface and deposits its water as soon as it drops below the dew point.

Cold spots: the missing word

Why do some areas condense and others not? Because not all parts of a wall are at the same temperature. Where the insulation is interrupted — a wall corner, a slab crossing the façade, the surround of a window, a reveal — the heat escapes faster. These are the **thermal bridges.** The surface there is colder than the rest of the wall, sometimes by several degrees. As a result, it is ***there***, precisely, that condensation forms first, and that the black patches appear.

This is the link we had not detailed until now. A cold wall is not uniformly cold: it has **weak spots**, and they are the ones that weep first. To understand this is to understand where to act.



Corners, window reveals, crossing slabs: these thermal bridges are the coldest surfaces — and therefore the first to condense and turn black.

Schools: the most demanding case

Nowhere is the problem as acute as in a school building. A classroom means twenty to thirty people in a confined volume, breathing and continuously releasing water vapour — not to mention CO_2. Indoor humidity climbs fast. If the walls are cold and the ventilation insufficient — which is common in an often-ageing stock — condensation and mould take hold.

And here, the stakes go beyond comfort: it is a question of **public health.** Mould is associated with respiratory irritation, allergies and worsening asthma — and children are particularly sensitive to it. A healthy gym, secondary school or classroom is not a luxury: it is a condition for learning, and a responsibility for the public authorities in charge of them.

Warm the wall, push the dew point away

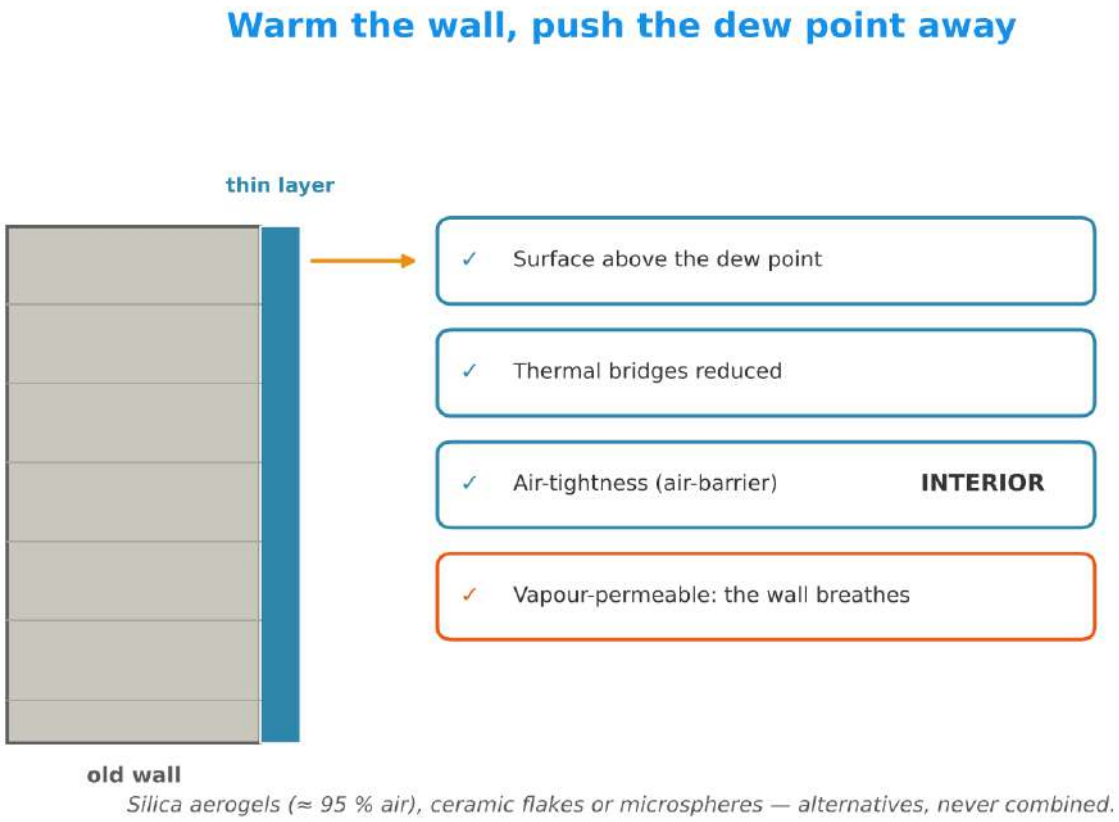
Here is the heart of the solution, and the direct extension of what we wrote about interior thermal regulation. If condensation appears because the surface is too cold, then **the key is to warm that surface** — to bring it back above the dew point. That is precisely what a thermo-reflective treatment applied on the inside makes possible.

As a thin layer, it acts on three fronts:

- **It raises the surface temperature** of the wall on the room side: the wall is no longer a cold spot, and condensation has nothing to cling to.
- **It reduces the thermal bridges** at corners, reveals and junctions — where it all begins.
- **It improves air-tightness** by treating the leaks, which bring in cold air and shift the condensation zones — a lever we had already highlighted.

A key point, and what sets a real solution apart from a cover-up: these treatments remain **permeable to water vapour.** The wall keeps breathing and releasing its moisture, instead of trapping it behind an airtight film — the classic mistake that moves the problem without solving it. Depending on the substrate

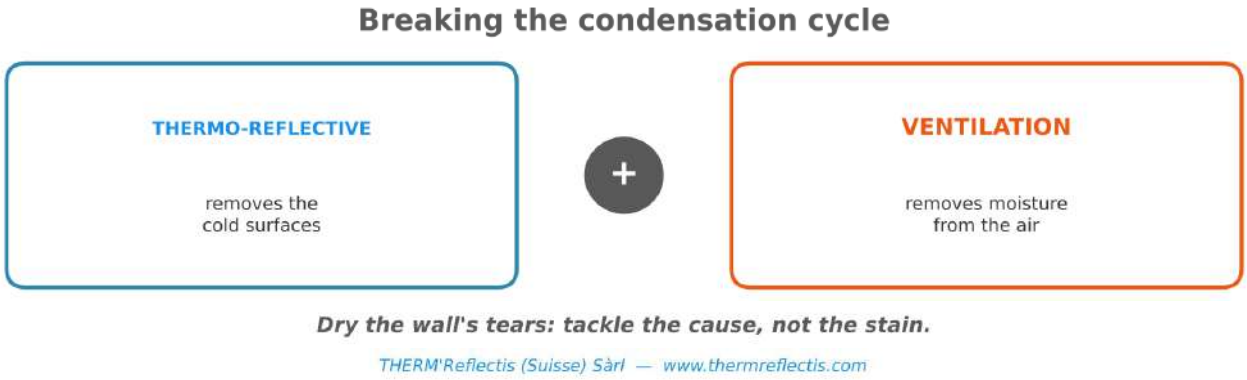
and the objective, several formulations exist (silica aerogels — made of nearly 95% air —, ceramic flakes or microspheres), always as alternatives, never combined.



Applied on the inside, the thin layer raises the surface temperature above the dew point, reduces thermal bridges and treats the air — all while letting the wall breathe.

A word of honesty: ventilation remains essential

Let us be clear: treating the walls does not remove the need to air out. The water vapour produced by occupants must be able to leave — through well-tuned mechanical ventilation or, failing that, regular and effective airing. Thermo-reflective and ventilation do not oppose each other: they complement each other. One removes the cold surfaces where water settles; the other evacuates the moisture from the air. Together, they break the condensation cycle.



Two complementary levers: thermo-reflective removes the cold surfaces, ventilation evacuates the moisture from the air. Together, they break the cycle.

A benefit that outlasts winter

Warming the interior walls is not only about ending the condensation and the black patches. It also means less heating — one stops overheating to offset the discomfort of cold radiation —, healthy walls that last longer, and indoor air that no longer weighs on occupants' health. The summer benefit we championed has its exact winter counterpart.

Drying the wall's tears

Walls do not “weep” by chance: they signal a wall that is too cold, and cold spots that are too vulnerable. Rather than repainting over the stains every summer, it is better to tackle the cause — the surface temperature. As a thin, reversible and breathable layer, thermo-reflective makes walls healthy and comfortable, from the home to the classroom.

Stop treating the stain, treat the cause: **a warm wall does not weep.**

***Sources** : Dew point and surface condensation principle (building physics; SIA 180 — indoor climate and ventilation; ISO 13788) · Link between indoor humidity / mould / respiratory health (FOPH — indoor air quality) · Vapour permeability of walls and air-tightness (EN 12114) · THERM'Reflectis article #23 — “The envelope does not work only in summer” · Technical documentation of partner suppliers: KOKUN Swiss SA (kokun.ch), RENOVCOAT (renovcoat.com), THERMACOTE (thermacote.com).*

Condensation, blackened corners, heavy air in your premises or classrooms? Let's run the diagnosis before the heart of winter.

Request a THERM'Reflectis diagnosis

Cool, Reduce, Reflect — naturally.

Our approach in 4 steps:

***Diagnosis** thermal and structural → **Planning** tailored → **Application** certified → **Monitoring** of the gains*

Was your building designed to meet this new challenge?

Your potential is unique. Whether it is a home, a rental building or a public building — school, secondary school, gym —, healthy and tempered walls are worth more than yet another coat of paint over the stains. **Let's reveal it with method.**

> ***Stop letting this potential lie dormant.***
> ***Every surface counts.***
> ***Every degree gained makes a difference.***
> ***Every project contributes to a more sustainable future.***

Contact THERM'Reflectis: together, let's turn your potential into results!

THERM'Reflectis (Suisse) Sàrl
Science and Innovation in the service of buildings.
connect@thermreflectis.com
+41 (79) 456 07 80
http://www.thermreflectis.com

YOUR POTENTIAL + OUR EXPERTISE = GUARANTEED RESULTS

“Revealing the hidden potential of every surface to create tomorrow's lasting value.
Your project, our mission.”