

The Fire Damper Nobody Checked: How a 3-Hour Reset Saved \$76,700

Return Air Failure Misdiagnosed as VAV Box End-of-Life · Case Study Date: December 5, 2025

\$76,700

Capital Expenditure Avoided

3 Hours

Time to Resolve

9

Prior Service Calls (Same Issue)

12

VAV Boxes Flagged for Replacement

BACKGROUND

HVAC Asset Management was engaged to validate a contractor's proposal to replace 12 VAV boxes in a commercial tenant suite experiencing persistent overheating. The contractor attributed the comfort failure to end-of-life VAV boxes no longer producing design cooling capacity — a conclusion drawn after nine service calls for the same complaint. A review of service records confirmed that each call was billed under slightly different language but addressed the identical condition. The proposed replacement scope carried a price tag of \$76,700.

THE FAILURE

Misdiagnosed Root Cause:

The contractor's repeated focus on VAV box output ignored a fundamental system-level question: if the supply air was adequate, why was the heat not leaving the space? The suite was being pressurized with conditioned air, but without a functioning return air path, heat had nowhere to go. The space operated like a sealed container — cold air in, no heat out.

Closed Fire Damper:

A forensic walkthrough identified a closed fire damper in the main return air shaft serving the affected floor. The damper had failed in the closed position, completely blocking the return air path. This single component failure was the direct and sole cause of all nine service calls.

No Return Path Verification:

None of the prior service calls included verification of the return air system. Return airflow, shaft pressure, and fire damper positions were never checked. Each visit treated the symptom (warm space) without investigating the cause.

THE CONSEQUENCE

Nine billable service calls, each addressing the same condition, produced no resolution because the system-level failure was never identified. The contractor's final recommendation — \$76,700 in new VAV boxes — would have been installed into a return air system that remained blocked. The suite would have continued to overheat, and the owner would have absorbed the full capital cost with zero improvement in tenant comfort.

THE RESOLUTION

The fire damper was reset in approximately three hours. Once the return air path was restored, interior temperatures and humidity levels in the suite stabilized within one operating cycle. No VAV boxes were replaced. No capital expenditure was required. The fix cost three hours of diagnostic labor.

KEY TAKEAWAY

Before any capital replacement is approved, return airflow must be verified. A space that cannot remove heat will remain hot regardless of how much cooling is delivered. In this case, a fire damper reset — not new equipment — was the solution. Validating the return air system before authorizing \$76,700 in VAV replacements saved the client every dollar of that investment.