

## FROM THE FIELD

## Vent dampers

BY DAN FOLEY CONTRIBUTING WRITER

The views represented in the column are the author's and not the publisher's.

I hate vent dampers. Oh, how I hate vent dampers. They are the stuff of my nightmares. Honeywell, Effikal, Johnson, Flair, Stack-Pack, Fields and others – I hate them all the same. Why you ask? How much time do you have? Pull up a chair.

What is the purpose of a vent damper? The idea is to retain the heat in the block during the boiler off cycle and to prevent the chimney from drafting air through the boiler and up the chimney. This raises the AFUE a point or two, and ideally saves the end user in fuel usage and operating cost.

This may be true in a laboratory where a white-coat technician can measure temperature variations and heat loss to the Nth degree, and where jacket and block losses are counted as usable heat. I call this gaming the test. I wonder how beneficial this device is in the real world, where boilers are installed in cold basements, unheated crawl spaces and other applications where jacket losses do not add usable heat to the structure.

I recognize that there are situations where the boiler is installed within the building envelope and jacket losses can contribute to heating the living space. But in my market, that situation is definitely in the minority of the installations. And, even if it does lose usable heat to the living space, my next point will make this fact moot.

It is such a simple device: a blade damper connected to a shaft driven by a small 24v synchronous motor. It receives the heat signal from the boiler ignition control sending 24v to the motor, which in turn drives the damper blade open. When it is fully open, an end switch makes allowing the burners to fire. Oh, so simple. Not so fast, my friend.

This is how it works in testing labs and in manufacturer's engineering labs. It is not how it works in the field. This is how it works in the field: You connect the vent damper because it is required by the manufacturer and by applicable codes. It works for a year or two, sometimes more, many times less. Then, it fails. The most prevalent failure point is the end switch. The damper opens but the end switch does not make leaving the client with no heat and no hot water (if an indirect DHW tank is installed).



Other times, the motor fails. The damper blade is in the flue vent stream. Hot flue gases heat the damper motor shaft cooking the motor. Other times, the blade gets hung up, either on an out-of-round flue pipe or on a misplaced screw. The motor cannot overcome this and the blade hangs up. The result is the same; no heat.

I was thinking about this a couple of weeks ago on a very cold Sunday morning where the low temperature in my neighborhood was 6°F at 5:00am. My buddy Rocky Pavey, in Fairbanks, Alaska, would be wearing shorts and a Hawaiian shirt. In my neck of the woods, single digit temperatures are the makings of a polar vortex.

I was in a 4-foot crawl space with my on-call tech, Joe Guererro. This type of crawl space is too short to walk but tall enough where you don't actually have to crawl. You kind of do a hunched over duck walk and try to avoid knocking your head on the floor joists. Joe had this down pat. Me? I already had a knot or two on my head with blood dripping from the spot where the flooring nail punched a hole in my scalp.

A gas fired cast iron atmospheric boiler, along with a horizontal DHW tank were jammed into the crawl space of this home built in the 1940s (See photo). The house was heated by two zones of copper fin tube baseboard. The Well-Trol tank was located in the crawl space along

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with all of the plumbing lines. On this particular morning, water was spraying from a water line that froze and split. Water was also dripping from an outside hose bib that froze and split but was now frozen into a solid block of ice.

I was still seeing stars from knocking my head on the floor joist when the homeowner shouted down through the hatch, "when do you think the heat will be back on?"

It took all of my inner strength to muster a civil reply, "Give us a few minutes to diagnose the problem. We will have the heat back on shortly."

The problem, as it turned out, was the vent damper (See photo). What was so infuriating was the intermittent nature of the failure. It would work on one cycle, but not the next. Cycle it 10 times, and the burner fired every time. But pack up the tools, put them away, write up the ticket, start up your truck, and before you can even back out of the driveway, it fails again. Oh, how I hate vent dampers.

In this case, I locked open the damper blade, disconnected the 24v power to the motor, and jumped out the end switch. I have done this so many times I don't even need to consult the wiring diagram. I have memorized the colors and the wiring. I can do this repair in my sleep. How many times? Dozens? Hundreds? Who knows.

I have been called out by manufacturers for doing this.

"You have broken the UL rating for the boiler."

"You have messed with the manufacturers wiring."

"What you are doing is unsafe."

"You have made the boiler less efficient."

I have to laugh at that last one. How much did my client save with a Sunday rate call and thousands of dollars in freeze damage and repair, never mind the inconvenience of no heat or hot water for 24 hours?

Even if I had a replacement vent damper on hand, the repair cost would have run several hundred dollars. Any savings attributable to the vent damper just evaporated. In my book, the better choice is to lock the damper open and bypass the end switch. I will give up a couple points in efficiency for the reliability of this set-up. And, I will continue this until a reliable vent damper is offered by manufacturers.

How much would it really cost to build a reliable vent damper with a heavier duty motor and a solid end switch that makes good contact when the damper is open? The problem may fix itself if minimum efficiency standards are mandated by DOE and atmospheric draft equipment goes away. Until then, I will continue to install the vent dampers as mandated by codes and manufacturers. And, I know I will be back at some point to either replace it or lock it open and bypass, as I have done so many times before. ●

*Dan Foley is president and owner of Foley Mechanical, Inc. based in Lorton, Va. FMI specializes in radiant, hydronic and steam systems as well as mechanical systems for large custom homes. He can be reached at [www.foleymechnical.com](http://www.foleymechnical.com), 703-339-8030, or [dfoley50@verizon.net](mailto:dfoley50@verizon.net).*

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