



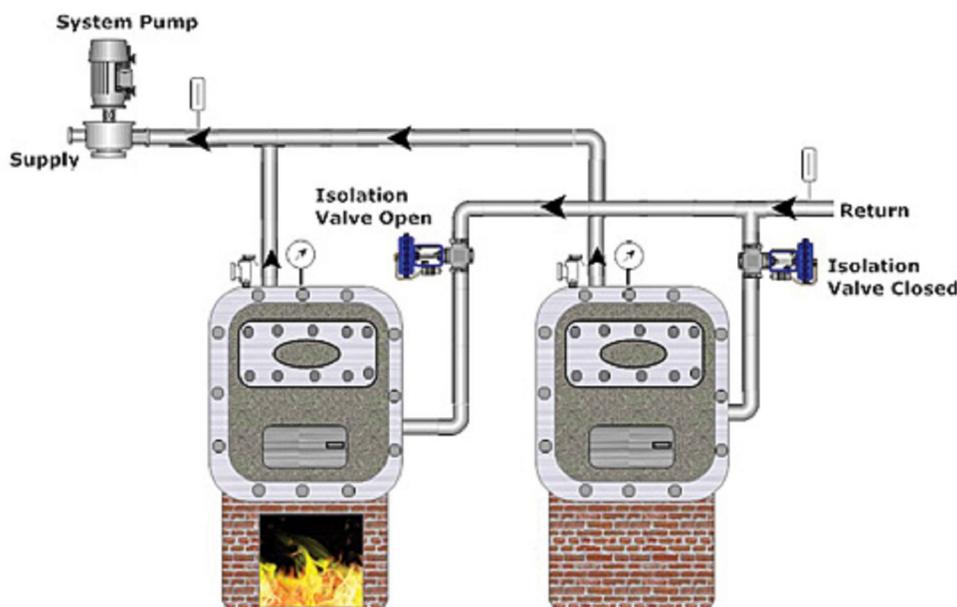
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Boiler Jacket Loss

The International Energy Conservation Code addresses the controversial subject.

By [Ray Wohlfarth](#)

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A debate has continued in the industry about whether boiler jacket loss should be factored into the calculation of boiler efficiency. Most of the old boiler rooms were very toasty places. If the old pipe insulation was removed, the boiler room was downright hot. While some believe the heat lost through the boiler jacket into the boiler room is wasted, others feel it is useful heat. Jacket loss is the transfer of heat from the boiler through the jacket and into the boiler room.

I would rather not get in the middle of that controversy but I do know one thing: Jacket loss trumps polyester pants every time.

A no-heat call came in from a client. I was on a sales call at the time and stopped at the client's building on the way back. I was wearing nice polyester pants. It was the '80s, after all. I bent over and saw that the pilot was off for the boiler. I lit the pilot and watched as the main burners started with a loud whoosh. I informed the maintenance man about what I found and the repair I had performed. We chatted for a while and he informed me that the burner flame would sometimes look yellow.

Before leaving, I knelt down to watch the flame. I was only there for a minute or two when I felt the heat on my knee and thigh. I jumped up but it was too late. The pants had shriveled from the heat and looked like an old raisin. As I stood up, I saw that the length of my pants was now above my ankle. I was red-faced and upset. “Hey, look at Ray with his flood pants,” one of the guys said laughingly to his co-worker. I would get teased for years over that fiasco.

IECC remedies

While I do not wish to weigh in on the benefits or losses of jacket loss, the International Energy Conservation Code believes it is something that should be addressed. The code stipulates that boilers should either be piped with primary/secondary piping or use an isolation valve that limits flow through the idle boiler.

In a primary/secondary system (**Figure 2**), each boiler has its own pump. If the boiler is idle, the pump will not operate. This will eliminate the water flow through the idle boiler. The pipe connections to and from each boiler must be no more than 12 in. apart on the primary loop. This isolates the boiler from the hot system water. It is the most common piping arrangement now, preferred by most boiler manufacturers. In addition to increased system efficiency, it assures proper flow for each boiler as each has its own pump, properly sized for the correct gallons per minute.

The other option in the energy code is to use isolation valves (**Figure 1**). A few factors should be considered when these are installed. The first is flow. When one boiler is off and is isolated from the system pump, all the flow will go through the boiler that is firing. This flow could be excessive and may be greater than the manufacturer recommends.

Remember, the system pump is sized to distribute the heat from all the boilers, plus a safety factor. The velocity of the water could be high enough that the boiler will not be able to give up its heat into the water. This could be very expensive as the boiler will lose its efficiency. A quick check of the temperature rise across the boilers will tell you if this is happening. Most boilers are designed for a 20° F temperature rise from the return to the supply when firing. If the temperature rise is low, the heat is not being transferred into the water. Make sure to check the temperature requirements of the boiler manufacturer.

Another factor to consider when using isolation valves is that the limit controls may trip and the building will be without heat until the reset button is pushed. When the burner shuts off, the internal boiler components will continue to generate heat for a short while. Since there is no flow due to the closed valve, the internal boiler temperature will continue to climb. I have witnessed temperature rises of 30° or more when the flow is shut off on a recently ended heat cycle. In many instances, this will be enough to trip the safety limit switch, which would be a manual reset-type of switch.

If using an isolation valve, a time delay should be used that will not allow the isolation valve to close until the temperature stops rising. This is usually 10 to 20 minutes after the burner shuts off.

A time delay also should be considered for steam boilers if isolation valves are installed on them. A vacuum breaker may be required as well if the boiler will be isolated from the steam system and allowed to condense.

Heating up lunch

The last factor to consider when using either of these piping systems is that the boiler room will be much cooler than it was with the old boilers, which had flow continually through them. In some instances, a separate heater may be required to provide heat for the boiler room. I realize that, in an ironic sort of way, we

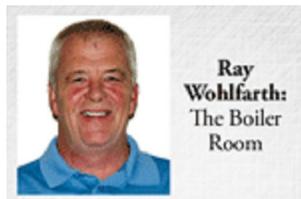
are now back to where we started.

In one of my first projects where the boilers were installed using primary/secondary piping, I realized the boiler room was much cooler than it was with the old boiler. Upon the completion of the project, the installer informed me with a sheepish grin that the custodian did not like our boilers at all.

I asked the custodian what was wrong. He shrugged his shoulders and said, “I don’t like ’em.” I could not believe it, so after a couple questions, I heard the real reason why he didn’t like my new high-efficiency boilers. The custodian used to place his lunch under the old atmospheric boiler and the jacket loss heated his lunch in the winter for the past 40 years. He could not do that anymore. I smiled and bought an inexpensive toaster oven for him. He loved my boilers then.

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