

HYDRONIC BUSINESS

Why professionals do the math

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There are 35 people in the class. All of them are good, solid heating professionals that care about what they're doing and who they're doing it for. Yet, when asked how many perform heat loss calculations for every job they do, only a smattering raise their hands.

Worse still, when asked how many perform heat loss calculations for every boiler replacement job they do, a sub-smattering — just two or three — raise their hands.

There are a few, of course, who turn their nose up at something as pedestrian as heat loss calculations. "I'm a professional, pal," they'll tell me. "I've been doin' this for 20 years. I can look at a job and just know what it's going to be."

The wisdom that comes with experience, no doubt? "Damn right!"

Well, here's the acid test, gang: If you ever find yourself tempted to skip the heat loss — maybe it's a small job, maybe it looks a lot like the last one or maybe you just don't freakin' want to — I want you to do the following:

Come up with the most rock solid reason you can for skipping the heat loss. I mean the one that you're most proud of, the reason you want to brag about and then put the words "Your honor" in front of it.

What do you think now?

That's really what it comes down to, doesn't it? In a court of law, they really don't want to hear that your experience told you what the heat loss was and that you've been in the business 20 years and never had a problem. You're in court! You have a problem! And you have nothing in your pocket to show the judge except your hand with a bunch of skin on it.

Recently, a gentleman, who looked to be in his late 50s, attended one of my two-day classes on Hydronic Heat Loss and Design. He told me that, in all his years of installing hydronic systems, he never knew how heat losses were done. He was trained in the old-school method of installation, which was very simple and had only two steps:

Step 1. Measure the available wall space in a room, including inside walls.

Step 2. Install that much baseboard.

In the class, we used a blueprint for a small, 1,400-square-foot house with a 1,400-square-foot heated basement. We assumed an indoor design temperature of 70, with an outdoor design temperature of seven degrees. Before starting on the calculations, I asked the guys in class to give me their best guess for the actual heat loss of the building. They reported numbers ranging from 50,000 Btu/h on the low end to 110,000 Btu/h on the high end.

The actual calculated heat loss of the structure? 30,000 Btu/h!

Whoa!

To a man, the people in class said that the numbers were hard to believe, even though they did the calculation themselves. I mean, can you really heat a 10 X 13 bedroom with just three feet of baseboard? Imagine if we had covered the walls with about 35 feet of baseboard. So, why is heat loss considered such a "lost art?" Is it

because we're so darned busy we don't have time? Is it because most houses are the same, and the calculations are a waste of time?

Personally, I think it's because so many of us don't really know how to do a heat loss calculation. And I put the blame on computers. Just about every manufacturer out there has software available to do heat loss calculations, radiant design calculations, hydronic layouts, boiler selection, etc. Once I was showing how to do radiant design calculations in class, and a kid with a "go-to-hell" face in the back asked if we had software that did all this.

"Yep. Sure do," I replied.

"Then why are we wasting time learning it this way? Why don't you just give us the software, and we can go home?"

There's your cover for the next issue of You're Missing The Point magazine.

Software makes it all very easy, so easy, in fact that no one really knows where the numbers come from anymore, or knows what those numbers mean. When you get right down to it, hydronic design software is nothing more than a fancy calculator. It does the arithmetic for you, but that's about it. It doesn't think for you, it doesn't make decisions for you and it doesn't make suggestions that could make the job work better. It simply makes calculations based on the data you input.

But where does that data come from? How do you know what outdoor design temperature to use? How do you know what the proper U-value for a given window or wall assembly is? Where do you find this information? And when you're done, what do the numbers really mean?

So, is heat loss really a lost art? No, it's not. It's a skill.

Calling it an art implies that you need some sort of special gift or talent bestowed upon you by your creator and that not having that gift somehow absolves you from having to do it. There's no art to heat loss; it's really just a matter of observation and arithmetic.

Observation involves spending some time reviewing the blueprints and building specifications, looking over the existing structure to find out what's there and then asking enough questions to provide you with the right information.

The math? Well, it's basically sixth-grade stuff — addition, subtraction, multiplication and division — and using texts and tables to find the right numbers and formulas to use. Pretty easy stuff, most of which you know already. When you understand how a heat loss is done manually, you'll start to understand and, more importantly, respect and trust the numbers software gives you.

It's good to know that a room requires 5,400 Btu per hour. It's better to know why it needs 5,400 Btu per hour. That way you're less likely to only put in 4,400, or 8,400. It's even better to know why a home needs a boiler capable of providing 68,522 Btu per hour and why one that can spew out 122,000 Btu may not be a good idea.

How is good, but why is better.

My old man, a proud graduate of Worcester Boys Trade School and a proud plumbing and heating professional for nearly 70 years, used to tell me, "Son, those who know how will always work for those who know why."

True 'dat! ●