

Saving Energy, Correctly Sizing Heating Systems

By James Quarello

As an energy auditor being conscious of how large the heating system is relative to the homes size is extremely important. After all it is the heating system that is costing the homeowner quite a bit of money to operate. Not to mention keeping them warm. The problem is that most system, especially older systems, are often greatly over sized for the job. In fact it was standard practice in the past to oversize the heating system by as much as 30%!

The rule of thumb, not a precise measure, is generally 50,000 gross BTUs of heating per 1000 square feet of living space for older, minimally insulated homes. Today's newer homes can be as low as 30,000 gross BTUs per 1000 sq. ft. or even lower!

Getting back to older homes, the house may have a "newer" heating system that replaced an old dinosaur, but the new system was sized by simply replacing it with the same size unit as the original. So the new system may be more efficient, but is still using more energy than needed to provide adequate heat for the home.

Another and more important consideration is upgrades to the thermal envelope. In other words has the home been better insulated. Increasing insulation, replacing old leaky windows and sealing air leaks will lower the amount of required heating system BTUs. In fact these improvements should be made first before installing a new boiler or furnace.

Consider an example of a home I audited recently. The home was a 1950s split level with 1600 square feet of living space. Only 1250 sq. ft. was heated. A lower level family room was not conditioned, but could easily be incorporated into the heating system with some simple plumbing work. The gross BTUs of the boiler was 172,000. Using the rule of thumb above for an older home, the system should be around 62,500 BTUs for the conditioned space. Adding in the family room would bring the number to 80,000. Quite a large difference between what was installed and what was actually needed.

As I mentioned above if the home owners follow the recommendations in the audit report concerning adding insulation and sealing air leaks, it is conceivable that a new system could be even smaller.

So before deciding to change your heating system here are a few points to consider:

- Get an energy audit. This will provide insight on where the home is most deficient and a plan on where to begin sensibly improving the home cost effectively.
- Before installing a new heating system improve the homes thermal envelope by making the necessary improvements outlined in your energy audit report.
- Be sure your heating system installer is considering all the improvements to your home when sizing the new system, not just going by the old system size.

There are always variables that can affect the sizing of any homes system. Therefore the rule of thumb is not a substitute for a competent, licensed heating specialist and the proper heating system size estimating tools. It can however give some idea as to where the size of the system should be in relation to the homes size and can raise a red flag for an educated homeowner.