

# **HVAC Sizing: Heating** (2 hrs) for SW Ohio, Northern KY & SE Indiana by John F Robbins CEM / CSDP

**2.0 contact hrs** for licensed engineers & contractors, also AEE certified energy professionals

## **Course Description**

Most HVAC engineers and contractors rely on various software nowadays to size heating systems. However, many calculations are simple enough to be done manually and quickly, especially when assessing changes to a home's or building's insulations, airtightness or outside air intake before proposing replacement heating equipment. For example, rather than redoing whole-building heating calculations after noticing such improvements have been achieved, manual quick calculations can estimate how much less heating load has resulted, thereby allowing replacement of a heating system with smaller output capacity than the older system. This course covers the major factors affecting heating load in common residential and small commercial structures. Also covered is the concept of "limited HVAC capacity" as mandated in energy programs like Passivhaus where HVAC capacities must not exceed mandated "BTU/hr per sf of conditioned space" specifications.

## **Learning Objectives**

- Understand basic manual calculations from ASHRAE Handbook Of Fundamentals for sizing heating systems, covering thermal conduction (R-values), air leakage and outside air supply with or without heat exchange recovery. Outdoor and indoor "design heating temperatures" are presented for major cities in Ohio, Kentucky & Indiana. Design heating temperatures are compared between ASHRAE's recommendations and local codes.
- Become familiar with widely varying R-values of common insulations and building materials.
- Learn to estimate "total average R" or "R(t)" in insulated assemblies. Calculating R(t) assesses all installed insulations and building materials to allow more accuracy in describing an assembly's thermal properties. Condensation potential is also discussed.
- When additional heating capacity seems needed but cannot be easily increased, or when project designers and planners want to avoid expanding heating equipment or distribution capacity, learn how to advise about how much added insulation, airtightness or other thermal improvements are needed and where.