

Passive Solar (2 hrs)

for southern Ohio and Indiana, middle & northern Kentucky

by John F Robbins CEM / CSDP

2.0 continuing education hours for engineers, contractors, designers and energy professionals

Course Description

Passive solar is about the design and components specifications of a structure to improve interior daylighting and reduce heating and cooling energy needs. This course presents an overview of passive solar design principles for the Ohio Valley and includes many photos of actual residential and commercial projects. In passive solar, the largest amount of windows face south and are protected by carefully configured roof overhangs or other shading strategies which admit a large amount of sun in winter but prevent much incoming sun during summer. Higher solar heat-transmitting glass and less obstructing window frames are also typical for south-facing windows. East and west windows are smaller and fewer, or protected by very large roof overhangs or other shading strategies, since most solar heating from east and west happens during the summer. Tables of hourly solar heat (in BTUs per hour) are presented for December, March, June and September, and calculations are demonstrated to show how much solar heating is possible via windows, whether intended as in passive solar design or accidental as in conventional structures where large window areas often face east or west without solar shading. Seasonal sun altitudes and azimuths are also presented for north latitudes 38 to 40, as well as how to perform a passive solar site evaluation. The importance of higher thermal efficiencies and heat storage are also discussed, as well as how floorplans and passive airflows in passive solar designs are often somewhat different from conventional structures.

Learning Objectives

- Learn to estimate how much solar heating energy can be collected by south-facing windows during winter, or by south-, east- and west-facing windows in summer.
- Become familiar with the different solar heat gain coefficients (SHGC) available among common window and glass choices. Understand when to select high or low SHGC.
- Understand seasonal and hourly sun positions throughout the year for north latitudes 38 to 40
- Learn how to configure more perfect overhangs and specify other summer shading strategies.
- Understand how to incorporate more thermal storage into the interior passive solar space.
- Compare passive solar heating performance versus varying thermal efficiencies to gain appreciation why passive solar works best with much higher R-values and airtightness than required by energy code.

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