

Solar Space Heating

By Al C. Rich December 2005

Because of its "black Crystal" all copper absorber, well insulated box, "double-glazed" performance and ease of installation, many homeowners and dealers use our "Skyline" collectors for their space heating systems. Other than giving general guidelines, **SolarRoofs.com does not sell space heating systems** because they are much more complicated than water heating systems. They also cost a lot more, can be prone to over heating, and need the most energy when the least is available. That said, properly designed systems have performed well and have made many customers very happy.

General guidelines:

- A rough rule of thumb is that 10 to 15% of the living area in a home is required to provide 50% of the space heating in sunny winter areas like Colorado. More area is required in cloudier areas like New England and most other northern states. Naturally the more efficient a house the less area is required. Remember, the best savings are initially gained by the conservation measures you take such as increasing insulation and reducing infiltration.
- At an average installed cost of from \$55.00 to \$80.00 per square foot, many times the actual size of a system is dictated by budget, rather than ideal performance.
- We recommend at least 160 square feet of collector area to make a reasonable contribution to your space heating needs.
- **A solar space heating system is much more sensitive to tilt and orientation than a solar water heating system.** For space heating the collectors must be facing (oriented) within 15 degrees of TRUE South, and need a tilt within 10 to 15 of latitude, usually the steeper the better to face the low winter sun. Note: Latitude is the elevation angle of a point above the equator.
- **Systems mounted on vertical South walls have had excellent results because they collect the low winter sun and usually do not over-heat in the high summer sun.** Snow on the ground can increase performance by actually reflecting solar rays onto the wall-

mounted collectors. The long, lightweight Skyline collector is excellent to mount on a wall or as an "awning" mount tilted off the wall.

- **Do not ever attempt to use solar with baseboard or radiator heating.** The 150 to 180 degree F temperatures required for convection are much too high for the solar collectors to operate efficiently during the winter. If you have baseboard heat consider using a "Fan Convecter" such as the Myson unit (<http://www.myson.co.uk/loline.htm>), they are great for solar space heating as they have the fan, heat exchanger, thermostat and pump all in one attractive unit. The Lo-line or the Slim-line are the ones I have used in the past.
- **People often make the mistake of thinking the solar will "preheat" the baseboard water when the baseboard water is actually in a closed loop leaving the boiler at usually 160 F and returning at 150 F.**
- A solar water heater can save a lot of money by preheating the domestic water going into an oil or gas boiler and by allowing the boiler to be turned off during the summer.
- **A excellent trend we have seen is to turn off the boiler in the summer and use the Rheem Heat Exchanger tanks upper electric element for the small amount of backup required during the times the boiler can be turned off.**
- On a sunny cold winter day, a flat plate collector can provide from 200 to 600 Btu's per S/F of collector area. Your heat loss needs to be determined for proper sizing. An example of a typical size array is 8 collectors for 160 S/F. This array would provide the energy of about what one gallon of propane in an 80% efficient heater would produce.
- **Air and radiant floor heating systems are a good match for solar space heating** because they usually require heat at around 100 degrees F for good performance. Seek out a good heating specialist with solar background to design your system.