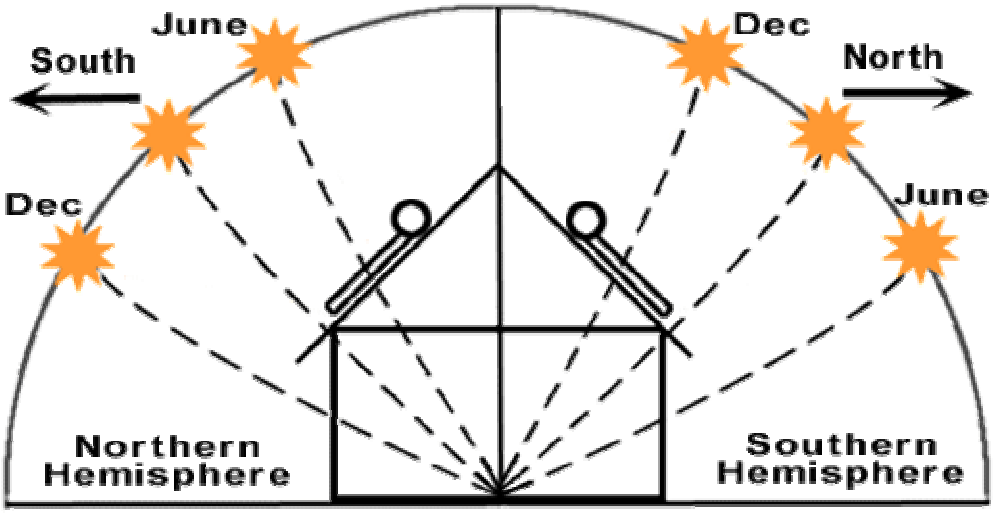
Deciding the Direction and Angle of Installation

The angle and direction of installation is also of great importance as it will effect the efficiency of the solar collector. Naturally you want the collector to receive the maximum amount of sunlight each day and throughout the year. As a general rule if you are in the Northern Hemisphere then the collector should face South and if you are in the Southern Hemisphere then the collector should face North. See diagram below.



The angle at which you mount the collector should roughly correspond to the latitude of your location. For example:
- Melbourne, Australia has a latitude of 37° South - the collector should therefore face north at a 37° angle.
- London, UK has a latitude of 51° North - the collector should therefore face south at a 51° angle.

You do not have to be too careful about mounting the collector at the exact angle suggested. If your roof angle is within 10°+/- of your desired angle you can just mount the solar collector flush against the roof surface. The added trouble of adjusting the collector to a precise angle is not warranted as it will not result in a great improvement in efficiency.

Seasonal Changes in Heat Output
How to prevent excessive summer heat output

If you are using the solar collector for space heating as well as hot water production, or if you just want a larger solar contribution, you will need a system that will greatly surpass heat requirements in the summer. Generally in the summer heating will not be required, in contrast cooling is. Unfortunately, at present solar cooling for domestic applications is not yet economically viable, so what to do with the additional heat? If you have a swimming pool or spa, the excess heat can be used to supplement heating. Turning off the pump and letting the collector stagnate is not ideal as high pressure and temps, and

large volumes of vented steam may result (wasted water).

If you do not have an additional means of using the excess heat, then adjusting the angle of the collector can help to reduce summer heat output. As can be seen by the diagram above, the sun is low in the sky during the winter and high in the summer. Solar smart house designs will take advantage of this by having big North or South (depending on your location) facing windows allowing maximum absorption of winter sun, with large eves or veranda to block out the summer sun.

By increasing the vertical angle of the collector by about 20° more the location's latitude (ie. 60° instead of 40°), greater winter performance will be experienced. This is because the collector is "facing" the sun (perpendicular - longitudinal angle). Due to the higher location of the sun in the sky during the summer, the collector will be around 40° from perpendicular and as such heat output will be reduced as the collector is not fully "facing" the sun. This simple solution alone can reduce peak summer output considerably, thus reducing problems associated with excessive summer heat production.

The above photo shows an ideal example of an installation angle that optimises winter, spring and autumn heat output, while minimising summer output. The high angle not only maximizes expose to the direct winter sun, but also allows the sunlight reflected off the snow to be absorbed. In the summer when the sun is high overhead the exposed surface area is small, especially with the overhanging roof which would partially shade the collector. In areas without snow fall (and a latitude range of 30-40°) an angle lower than that shown above would be suitable.

Please note: For the Apricus solar water heater, optimal heat pipe performance is achieved in the angle range of 20-70°. Although your locations may have a latitude of less than 20°, this basic installation guideline should be adhered to. Horizontal angles of +/- 5° are acceptable and may be appropriate if the manifold needs to be drainable (end port models only).