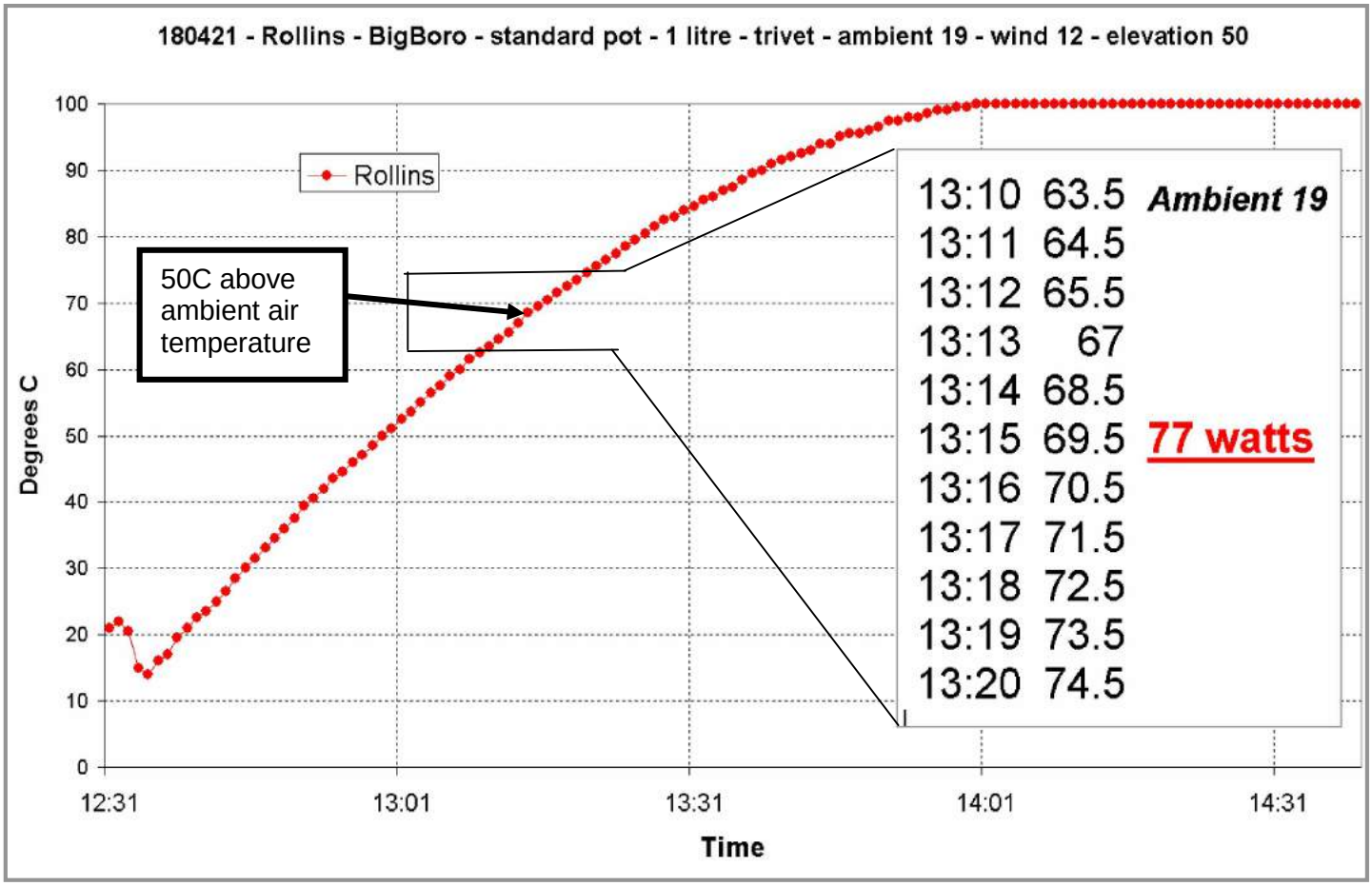
lazyPEP

There are several methods of testing the cooking power of solar cookers. Most involve heating water. Recently, Alan Bigelow, of Solar Cookers International (SCI), published the Performance Evaluation Protocol (PEP). This test method takes a lot of variables into account, including the intensity of the sunlight, windspeed, ambient temperature, etc. The test equipment costs around £1000. At SLiCK, we have developed a 'quick and dirty' method of estimating PEP results. These are not as accurate as SCI PEP scores, but they are close enough to be useful. We call our method lazyPEP because very little equipment is needed, and the calculation is very easy. The lazyPEP test is a compromise, and we think cooker manufacturers should have their products properly tested by the SCI, using the standard PEP.

The SCI PEP asks the following question: ***How quickly can this solar cooker supply energy to the food/water when its temperature is 50C above the ambient air temperature?***.
The basic formula for calculating this figure, the amount of cooking power, in watts, is:
The volume of water x the specific heat capacity of water x the rise in temperature, all divided by the amount of time it took for the temperature rise that far.

If we use a litre of water (1000cc), and a ten minute interval (600 seconds), **it turns out that we only need to multiply the temperature difference by seven, and we have our answer, in watts**. There is a worked example below, using a real dataset from a recent test of the Rollins panel cooker.



Notice that the ambient air temperature is 19C. We are interested in the cooking power 50C above ambient, so we look for the datapoint when the water temperature is 69 (i.e. 19C + 50C - in this case, we choose the nearest recorded temperature, which is 69.5C). We count back 5 minutes to 13.10, when the temperature was 63.5C, and forward 5 minutes, to 13.20, when the temperature was 74.5C. We conclude that the temperature of the water rose 11C over that ten minute interval (74.5C-63.5C). So power was supplied to the water over that period at a rate of 11 x 7 = 77 watts. We know from other lazyPEP results that this is very good for a panel cooker.

What could go wrong? Sunlight provides more energy near the middle of the day, less if the atmosphere is misty. The PEP allows for these differences, but the lazyPEP doesn't. This is one possible source of error.