

Working in Extreme Heat Its not worth dying for.

If you live in Australia you would almost certainly have suffered from some level of heat stress at some time. Profuse sweating, dehydration, heat rash, headache, light headedness, nausea and even fainting are all fairly common symptoms of heat stress, particularly when it's humid as well. These symptoms are your body trying to keep itself cool. If your core body temperature gets too high, heat stress becomes heat stroke which can cause permanent damage or death. So if you work in the ceiling space of a building on a hot day, do you know what's safe, when does it become risky and when does it become outright dangerous?

The death of an insulation installer from heat stroke, after working in extreme temperatures in a roof space in western Sydney, caused sensational headlines around Australia. As this incident was in a similar environment to that which air conditioning contractors often find themselves Temperzone felt it would be good to have a detailed look at heat stress, heat exhaustion and heat stroke and how to maintain safety in very hot work environments.*

Whilst full details of the fatal incident in NSW are not available, what is known provides a good basis to look at heat stress in the work place. The worker was working in an unventilated roof space on a day when outside temperatures reached 41C. There have been some suggestions that the interior temperature in the roof space was around 60 C. It was the workers first day on the job. His condition wasn't noticed until he collapsed in the street just after lunch. By the time he collapsed he already was suffering from heat stroke. He was rushed to hospital but lapsed into a coma and died from heat stroke related organ failure. One obvious question is why did this worker suffer heat stroke and not his co-workers?

When looking at personal factors it is important to understand every worker responds to working in a hot environment differently. People who regularly work in a hot environment may even have different tolerance on different days. If someone on your team tells you they don't feel OK working in a very hot environment, take notice and take steps to make sure their health is not in danger. **This is not a situation to tell**



someone to shut up and get back to work.

THE KEY PERSONAL FACTORS ARE ACCLIMATIZATION, FITNESS, HYDRATION AND STATE OF HEALTH.

Acclimatisation is an important factor as most people get used to working in hot environments and so can tolerate higher temperatures for longer periods.

Fitness is another very variable factor. In general fitter people have higher tolerance of high temperatures.

Hydration is critical in hot environments as dehydration is a major factor in turning heat stress into heat stroke. You should start drinking water before you start working in the hot environment. Make sure your team has an adequate supply of cold water and that they drink it frequently.

There are a number of health conditions which seriously impact on a person's ability to cope with extreme heat. On top of the list are heart disease and high blood pressure. If someone on your team suffers from either of the above it is probably safest not to put them in high temperature environments.

As all "fridgies" are teetotallers and hence would never come to work with a hangover, you may be surprised to know that dehydration caused by alcohol consumption means you will dehydrate faster in hot conditions faster and hence be less tolerant of heat stress.

SO WHEN IS TOO HOT TO WORK?

It may come as a surprise, but there is no defined temperature above which it is too hot to work. There are however conditions when it is not safe to work. The key word here is safe, because in a work environment it is the duty of care of the employer to ensure the workplace is safe to work in. (Note: duty of care may extend to subcontractors also.) So how do you know what is safe and what is not. Unfortunately the answer is not simple as the safety guidelines take in a range of factors some of which are beyond the scope of most HVAC contractors to measure.

THE MAIN ENVIRONMENTAL FACTORS ARE; TEMPERATURE, RADIANT HEAT, AIR SPEED AND HUMIDITY.

In Australia the standard method of working out safe working temperature is to put all of these into one measurement called WBGT. Unfortunately you need a specially made instrument costing in several thousand dollars and it needs to be installed for up to an hour in the workspace before you get accurate reading. If you want more information try <http://www.airmet.com.au/Product/Quest-Temp-32.aspx>



To give you an idea how this works and what the difference inside the ceiling and outside can be Airmet kindly put one of their heat stress monitors in the ceiling of a house in suburban Melbourne on a day when the maximum temperature only reached 33 C. Inside the ceiling was another matter.

At 9 am it was 26 C outside and was actually only 23 C inside the ceiling. The temperature climbed both inside and out during the morning so at midday it was 30 C outside and 38 C inside. At this point the monitor was still saying the conditions were ok for continuous work inside the ceiling.

However things changed quickly inside the ceiling. By 12:10 the monitor was now indicating that it was safe to work for 45 minutes per hour

in the ceiling (inside temperature was 39 C) and by 12:30 this had dropped to only 30 minutes per hour (inside temp was 41 C). By 1:10pm it had dropped to 15 minutes per hour (inside temp 44 C) and by 2:20pm the monitor was indicating that it was unsafe to work in the ceiling at all. (inside temp was 46 C). The maximum temperature inside the ceiling was 47.6 C at 2:50 when the outside temperature was 33 C.

The monitor indicated it was ok to work inside for 15 minutes an hour at 3:30 with the inside temp still at 46 but lower humidity. At 4:40 it was ok to resume 30 minutes per hour and by 6:00pm it ok to work for 45 minutes per hour. It was not safe to resume continuous work until 7.00pm with the inside temperature still 37 C.

Given the environmental and personal factors above it is worth re-examining the factors we know from the death of the insulation worker in Sydney.

The outside temperature was over 40 C which in its own right would have limited work to a maximum of 30 minutes at a time. If the reports of 60 C inside the ceiling are correct it was simply too hot to work in the space.

It was the workers first day on the job and he was almost certainly not acclimatised.

The fact that he collapsed with heat stroke after lunch also suggests he had dehydrated quickly.

To have reached the stage of actual heat stroke he would have gone through a range of early warning symptoms; profuse sweating, light headedness and inability to concentrate, headache, heat rash. Oddly as heat stress progresses to heat stroke you actually stop sweating but become delirious and eventually go into a coma. It would seem his symptoms went unnoticed.

Under the OH&S laws in every state it is the employers duty of care to ensure a safe work place for your employees. So make sure you understand the risks, have a clear policy and procedures for working in a hot ceiling (or for that matter on the roof of a shopping centre in similar conditions). One of the most important and simple procedures is to use a buddy system where workers keep a watch on each other for symptoms of heat stress. This is particularly important for new and unacclimatised staff. Most importantly don't take risks with workers health in this environment. Its just not worth dying to get the job done on time.

See the useful links for the NSW code of practice for working in hot and cold environments. The full WGBT instrument is available for purchase or hire from www.airmet.com.au

* The information provided here is intended for use as general information and should only be used as a guideline for working in hot environments. If you require specific information on this subject contact your local work cover authority or a qualified consultant.