

## GS 29 HEAT STRESS



### WHAT IS HEAT STRESS?

Heat stress is the total heat burden to which the body is subjected by both external and internal factors, ie:

#### external

- temperature
- humidity
- amount of air movement
- radiant temperature of surroundings
- clothing

#### internal \*

- physical activity (metabolic heat load)

Heat stress is not, in itself, a medical condition. However if it is high enough, the body needs to use cooling mechanisms to maintain normal function and to prevent adverse effects such as heat stroke.

### WHAT ARE THE BODY'S COOLING MECHANISMS?

The body can lose heat by the following means:

- convection (heat loss to air)
- radiation (heat loss to surrounding objects)
- evaporation of sweat.

In very hot conditions, sweat evaporation is the only means by which the body can maintain its temperature within the narrow range necessary

for healthy functioning. The large amounts of fluid that can be lost by this mechanism must be replaced to prevent dehydration and the failure of heat regulation that will ensue.

### WHAT HAPPENS IF THE COOLING MECHANISMS ARE INSUFFICIENT?

Several conditions of varying severity may occur:

- fatigue
- heat exhaustion
- heat cramps
- heat stroke.

### ARE SOME PEOPLE MORE LIKELY TO SUFFER THE ADVERSE EFFECTS OF HEAT STRESS?

**Yes**, people who are overweight, physically unfit, suffer from heart diseases, abuse alcohol or take certain other medications are at greater risk of the conditions listed above.

People who are not acclimatised do not have as efficient sweat-evaporating cooling mechanisms as those who are, and should build up gradually to a full workload in hot conditions over a period of about one week. This should again occur after one or two weeks away from hot work, as acclimatisation is rapidly lost.

It should also be realised that people vary in the efficiency of their cooling mechanisms and hence their ability to tolerate heat stress.

### CAN THE LEVEL OF HEAT STRESS BE MEASURED?

**Yes**, the level of heat stress burden can be measured by various means including the use of Wet Bulb Globe Thermometer. Application of appropriate tables by a suitably trained person can then give an indication of whether adverse effects of heat are likely to occur with particular activity levels and working conditions.

Such an assessment will assist in the prevention of adverse effects of heat stress.

## HOW CAN THE ADVERSE EFFECTS OF HEAT STRESS BE AVOIDED?

By measures which decrease the level of the heat stress or improve the efficiency of the body's cooling mechanisms.

These include:

1. Altering the work schedule so that heavier work is done during cooler periods.
2. Reducing the radiant heat load by providing shade in outdoor work and shielding from sources of radiant heat in indoor work (eq. furnaces).
3. Increasing convective heat loss by improving air circulation.
4. Promoting evaporation of sweat by reducing humidity, increasing air movement and wearing suitable clothing.
5. Preventing dehydration by active attention to adequate fluid replacement. Salt may be added to fluids but is only required in small amounts when sweating is heavy and continuous. Salt tablets are unnecessary and not recommended.
6. Ensuring workers are fit, acclimatised and not taking medication that will impair their ability to cope with heat stress.
7. Allowing rest periods, if possible, in air conditioned spaces. This helps in three ways- lowering metabolic heat production, decreasing environmental body heat and providing an opportunity to increase fluid intake.
8. Allowing self regulation of work if fatigue, discomfort or other symptoms occur.

## HOW SHOULD ADVERSE EFFECTS OF HEAT STRESS BE TREATED?

Some adverse effects (eg. heat stroke) are very serious and must be regarded as medical emergencies.

If the person appears to be suffering from heat exhaustion the following measures are appropriate:

- remove from heat
- rest in coolest available place
- encourage drinking cool (**not cold**) fluids
- obtain medical or nursing assistance.

If heat stroke is suspected (decreasing sweating, high temperature, hot, dry skin, and even confusion and loss of consciousness) medical attention is required urgently. First aid consists of cooling the body as quickly as possible (eg. soaking the victim's clothing in cold water) and increasing air movement by fanning the victim.

## A NOTE ON THERMAL DISCOMFORT

Exposure to hot and cold conditions can result in a spectrum of outcomes that range from mild discomfort to life-threatening medical conditions. Thermal discomfort is at the mild end of the spectrum and is distinguished from the more severe effects of heat and cold stress by the absence of significant potential for adverse medical outcomes.

The temperature range within which employees are comfortable at work varies widely according to factors such as the type of work, the clothing worn, air movement, radiant heat, humidity and even individual preferences.

Moreover, community and employee expectations in terms of thermal comfort are undergoing constant and ongoing change (eg the provision of air-conditioning in cars).

It is therefore difficult to specify industry-wide thermal comfort standards, and individual situations should be negotiated on their merits. Some degree of subjectivity is inevitable.

However, when work is undertaken outside what is generally considered a comfortable temperature range for a particular industry and as a result there is real potential for adverse health effects from excessive heat or cold, then the issue goes beyond thermal comfort and should be addressed as an Occupational Health and Safety matter.

In addition, if the level of thermal discomfort is considered sufficient to significantly increase the risk of accidents and consequent injury, then a hazard exists and effective hazard management is required.

If, however, the level of thermal discomfort is assessed as insufficient to result in the health risks mentioned above, it becomes more a matter for negotiation in the Industrial Relations arena than an OH&S issue.

Even so, enlightened employers are aware that employee comfort has a significant impact on morale, productivity and quality of work output, and realise that efforts to achieve the highest practicable comfort standards will generally be rewarded by positive business outcomes.

### For further information contact:

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