



## Heat stress in the workplace. What you need to know as an employer

### General Information Sheet No 1

#### Introduction

This leaflet tells you about the risks of overheating when working in hot conditions and gives practical guidance on how to avoid it. It does not address issues of thermal comfort in the workplace (for more information on this, see *Thermal comfort in the workplace: Guidance for employers*).

Heat stress occurs when the body's means of controlling its internal temperature starts to fail. As well as air temperature, factors such as work rate, humidity and clothing worn while working may lead to heat stress. Therefore, **it may not be obvious to a person passing through the workplace that there is a risk of heat stress.**

You and your employees must be aware of how to work safely in heat, the factors that can lead to heat stress, and how to reduce the risk of it occurring.

#### How does the body react to heat?

The body reacts to heat by increasing the blood flow to the skin's surface, and by sweating. This results in cooling as sweat evaporates from the body's surface and heat is carried to the surface of the body from within by the increased blood flow. Heat can also be lost by radiation and convection from the body's surface.

#### Typical example of a heat stress situation

Someone wearing protective clothing and performing heavy work in hot and humid conditions could be at risk of heat stress because:

- Sweat evaporation is restricted by the type of clothing and the humidity of the environment.
- Heat will be produced within the body due to the work rate and, if insufficient heat is lost, deep body temperature will rise.
- As deep body temperature rises the body reacts by increasing the amount of sweat produced, which may lead to dehydration.
- Heart rate also increases which puts additional strain on the body.
- If the body is gaining more heat than it can lose the deep body temperature will continue to rise. Eventually it reaches a point when the body's control mechanism itself starts to fail.

The symptoms will worsen the longer they remain working in the same conditions.

#### What are the effects of heat stress?

Heat stress can affect individuals in different ways, and some people are more susceptible to it than others.

Typical symptoms are:

- an inability to concentrate;
- muscle cramps;
- heat rash;
- severe thirst - a late symptom of heat stress;
- fainting;
- heat exhaustion - fatigue, giddiness, nausea, headache, moist skin;
- heat stroke - hot dry skin, confusion, convulsions and eventual loss of consciousness. This is the most severe disorder and can result in death if not detected at an early stage.

#### Where does heat stress occur?

Examples of workplaces where people might suffer from heat stress because of the hot environment created by the process, or restricted spaces are:

- glass and rubber manufacturing plants;
- mines;
- compressed air tunnels;
- conventional and nuclear power plants;
- foundries and smelting operations;
- brick-firing and ceramics plants;
- boiler rooms;
- bakeries and catering kitchens;
- laundries.

In these industries working in the heat may be the norm. For others it will be encountered more irregularly depending on the type of work being done and changes in the working environment, eg seasonal changes in outside air temperature can be a significant contributor to heat stress.

#### What do I need to do about heat stress?

Over time people adapt to hot conditions by sweating more, and by changing their behaviour to try and cool down, eg removing clothing, taking cool drinks, fanning themselves, sitting in the shade or a cool area, and/or reducing their work rate. However, in many work situations such behavioural changes may not be possible, eg during asbestos removal. Where there is a possibility of heat stress occurring you will need to carry out a risk assessment.

#### What do I need to look at in a risk assessment?

When carrying out a risk assessment, the major factors you need to consider are:

- work rate - the harder someone works the greater the amount of body heat generated;

- working climate - this includes air temperature, humidity, air movement and effects of working near a heat source;
- worker clothing and respiratory protective equipment - may impair the efficiency of sweating and other means of temperature regulation;
- worker's age, build and medical factors - may affect an individual's tolerance.

Firstly, you will need to talk to the workers involved (and their safety representatives), to see whether they are suffering early signs of heat stress. If it seems likely that there is a problem, you may need to consult with people who are more experienced in determining the risk from hot environments, eg occupational hygienists, nurses or doctors.

### **How can I reduce the risks?**

Remove or reduce the sources of heat where possible:

- **Control the temperature** using engineering solutions, eg
  - change the processes,
  - use fans or air conditioning,
  - use physical barriers that reduce exposure to radiant heat.
- **Provide mechanical aids** where possible to reduce the work rate.
- **Regulate the length of exposure** to hot environments by:
  - allowing workers to enter only when the temperature is below a set level or at cooler times of the day,
  - issuing permits to work that specify how long your workers should work in situations where there is a risk,
  - providing periodic rest breaks and rest facilities in cooler conditions.
- **Prevent dehydration.** Working in a hot environment causes sweating which helps keep people cool but means losing vital water that must be replaced. Provide cool water in the workplace and encourage workers to drink it frequently in small amounts before, during (this is not possible in some situations eg respiratory protective equipment use or asbestos removal) and after working.
- **Provide personal protective equipment.** Specialised personal protective clothing is available which incorporates, for example, personal cooling systems or breathable fabrics. This may help protect workers in certain hot environments. Protective clothing or respiratory protective equipment is often required when there will be exposure to some other hazard at work eg asbestos. This type of equipment, while protecting from the other hazard, may increase the risk of heat stress.
- **Provide training for your workers,** especially new and young employees, telling them about the risks of heat stress associated with their work, what symptoms to look out for, safe working practices and emergency procedures.

- **Allow workers to acclimatise** to their environment and identify which workers are acclimatised/assessed as fit to work in hot conditions.
- **Identify employees who are more susceptible** to heat stress either because of an illness/condition or medication that may encourage the early onset of heat stress, eg pregnant women or those with heart conditions. Advice may be needed from an occupational health professional or medical practitioner.
- **Monitor the health of workers at risk.** Where it is considered that a residual risk remains after implementing as many control measures as practicable, you may need to monitor the health of workers exposed to the risk. You should then seek advice from occupational health professionals with a good working knowledge of the risks associated with working in heat stress situations.

### **Further reading**

*Thermal comfort in the workplace: Guidance for employers* HSG194 HSE Books 1999  
ISBN 0 7176 2468 4

*New and expectant mothers at work: A guide for employers* HSG122 (Second edition) HSE Books 2002  
ISBN 0 7176 2583 4

*British Occupational Hygiene Society Technical guide No 12 The thermal environment (Second edition)*  
H and H Scientific Consultants Ltd 1996  
ISBN 0 948237 29 5

### **Further information**

HSE priced and free publications are available by mail order from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA Tel: 01787 881165 Fax: 01787 313995  
Website: [www.hsebooks.co.uk](http://www.hsebooks.co.uk) (HSE priced publications are also available from bookshops and free leaflets can be downloaded from HSE's website: [www.hse.gov.uk](http://www.hse.gov.uk).)

For information about health and safety ring HSE's Infoline Tel: 08701 545500 Fax: 02920 859260  
e-mail: [hseinformationservices@natbrit.com](mailto:hseinformationservices@natbrit.com) or write to HSE Information Services, Caerphilly Business Park, Caerphilly CF83 3GG.

This leaflet contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.

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