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## 1. OBJECTIVE

The purpose of this instruction is to provide guidance for a safe and healthy environment for staff, students, contractors and visitors to RMIT by addressing the issue of thermal comfort. This instruction is to provide information on the identification and control of risks in thermal environments (hot or cold) where staff, contractors or students may be required to conduct work tasks or activities.

## 2. PROCEDURE

### 2.1. Identifying and controlling thermal comfort issues

Working in hot or cold conditions without adequate control measures can create a number of health effects ranging from discomfort to serious illness. This guidance provides a means of ensuring that all members of the RMIT community are aware of the risks associated with working in these environments and the control measures that can be implemented to minimise the risk of injury.

Thermal comfort is determined by subjective judgement, and even in optimal conditions some individuals may experience discomfort. When conditions are not optimal they can result in:

- Reduced productivity and efficiency
- Lack of concentration
- Dehydration
- Increased risk of accidents.

Individual thermal comfort can be affected by environmental and personal factors such as air temperature, air movement, humidity, clothing, crowded working areas, the job being undertaken, physical exertion, radiant temperatures and sun penetration. Individuals with existing medical conditions such as cardiovascular diseases, respiratory conditions and kidney problems can be more predisposed to adverse health effects from working in conditions that are not ideal.

Operational Leaders should address the risks of thermal comfort in consultation with the exposed individuals. Problems should be anticipated and appropriate action taken before injury or illness occurs. Investigate the situation considering:

- Individuals' perception of the situation. Do they find the atmosphere hot, cold, stuffy or draughty?
- When do individuals notice these conditions?
- Individuals' level of acclimatisation, and the possible physical and psychological effects of continued exposure
- What effect do these conditions have on performance?
- The requirement for work to continue at that particular time
- The estimated duration of the thermal extreme

Operational Leaders should discuss control measures with the affected individuals and request that they:

- Work at a sensible pace
- Look for warning symptoms and self-monitor as they work
- Rest in a cool well-ventilated area and drink cool fluids if symptoms occur
- Seek first aid or medical assistance if symptoms do not reduce rapidly

Staff, students and contractors have a responsibility to adopt the required controls, such as wearing suitable clothing for the environment (consider layers that can be reduced or added to as people move indoors and out), for using appropriate PPE for working in hot or cold environments, and for reporting conditions which may affect their work capability to their leader.

All staff, students and contractors with the potential for exposure to hot and cold environments, through their work or study should be trained to recognise the warning signs if their health is being affected, and in the hazards, risk and controls measures to protect persons from these temperatures. Senior First Aid Training is also recommended.

Human Resources, Health, Safety and Wellbeing can provide advice and technical support regarding the hazards and controls associated with working in thermal environments. This includes administrative arrangements such as provision of training in hazard and risk management processes.

Property Services may be able to provide adequate interim solutions to thermal comfort issues when existing systems break down. In leased buildings Property Services will work with the building manager to resolve any thermal comfort issues.

## 2.2. Optimal conditions

An acceptable air temperature range is regarded as 18-30°C.

In indoor environments where light or sedentary work is carried out the following are the optimal conditions:

- Air temperature (dry bulb temperature) 20-26°C depending on the clothing worn and the season
- Relative humidity 30-60%

The optimum indoor winter temperature range is 19-22°C, this is about 1-3°C lower than summer temperatures. Acceptable winter temperature range is 18-24°C, also lower than in summer.

## 2.3. Hot and humid conditions

High humidity can create a stuffy, sticky atmosphere and contribute to feelings of tiredness. There are considerable differences between individuals regarding what is comfortable and it is unlikely that a single temperature or level of humidity will suit everybody. When humidity is high, tolerance of high temperatures is reduced, due to the decreased capacity for cooling from evaporation of sweat. Subjective feelings about humidity should be taken into account when considering modifying or suspending work.

## 2.4. Indoor environments

In many cases, although individuals may feel considerable discomfort, the work conditions are such that there is no significant risk of succumbing to the serious health and safety problem of heat illness. Individuals, who work indoors completing sedentary tasks, for example working in an office, are very unlikely to be at risk of suffering heat illness.

Any heat problems they experience are far more likely to be due to heat discomfort. Some general suggestions for improving thermal comfort include:

- Regulate air conditioning for temperature and humidity
- Avoid locating workstations directly in front of or below air conditioning outlets
- Install deflectors on air vents to direct airflow away from people to avoid draughts
- Control direct sunlight (radiant heat) with blinds, louvers and window treatments
- Minimise draughts and thermal differences between the head and the feet (thermal gradients) and ensure adequate air flow. Feelings of stuffiness can result when air flow is low, and draughts occur when air flow is high

Where heavy work is carried out in indoor environments or when the indoor environment cannot be cooled effectively the following measures should be taken to reduce the effects of thermal distress:

- Reducing thermal radiation (solar radiation or heat given off by equipment)
- Providing constant supplies of drinking water (i.e. immediately accessible drinking water)

- Increasing air movement around the worker (portable fans or cooling devices )
- Promoting regular rest breaks (to allow recovery )
- Changing the rate of work (e.g. taking longer to do the job) or job rotation
- Changing the work schedule (e.g. heavy work during cooler times of the day)
- Providing lighter alternative work
- Supply of cool drinking water

Where staff or students suffer personal distress from the effects of indoor air temperature of 30oC or above and the cause of the temperature increase cannot be eliminated, the Operational Leader for the area should allow regular rest periods in a suitable environment or consider relocation to a different area. In extreme cases a person may be released from duty without loss of ordinary pay (staff) or without academic disadvantage (students).

## 2.5. Outdoor environments

Staff and students on field trips or working outdoors may be at risk from heat stress during summer when there is a combination of heat load from sunshine and heavy manual work. If the central body temperature rises too far the heat regulating mechanism fails leading to a serious medical emergency. Thermal discomfort may occur long before any illness occurs.

Where possible the following measures should be taken to reduce the effect of thermal distress:

- Personal protection (e.g. sun hat, light clothing to cover the skin, sun glasses, sun screen protection cream (SPF 30+ )
- Supply of cool drinking water
- Use of shade (natural or artificial)
- Changing the rate of work (taking longer to do the jobs) or job rotation
- Changing the work schedule (heavy work during cooler times of day )
- Changing the work location
- Providing lighter, alternative work

Where staff, students or contractors suffer personal distress from the effects of the outdoor temperature the Operational Leader for the area should allow regular rest periods in a suitable shaded, cooler, environment or consider changing tasks and/or relocation to a different area. In extreme cases individuals may be released from duty without loss of ordinary pay (staff) or without academic disadvantage (students).

## 2.6. Heat illness

Heat illness covers a range of medical conditions that can arise when the body is unable to properly cope with working in heat. These conditions include:

- Heat stress or fatigue occurs when the body becomes dehydrated and is unable to cool itself enough to maintain a healthy temperature. If left untreated, this can lead to heat stroke, which is a life-threatening medical emergency
- Heat exhaustion – this is a serious condition that can develop into heat stroke. Warning signs may include a pale complexion and sweating, rapid heart rate, muscle cramps and weakness, dizziness, headache, nausea, vomiting or fainting
- Heat stroke – this is a life-threatening emergency and requires urgent attention. Heat stroke occurs when the body is unable to prevent the temperature rising rapidly. The symptoms may appear the same as for heat exhaustion, but the skin may be dry with no sweating and the person’s mental condition worsens. They may stagger, appear confused, have a seizure, appear to have a stroke or collapse and become unconscious
- Fainting in heat (heat syncope)

- Heat cramps
- Skin rashes (prickly heat); and
- Worsening of pre-existing illnesses and conditions

Signs and symptoms of heat illness include feelings of sickness, nausea, dizziness, weakness, clumsiness, collapse and convulsions. Persons with these signs or symptoms should seek immediate first-aid or medical attention. Other health and safety problems caused by hot working conditions include:

- Sweaty hands causing a loss of grip while handling objects, controls, etc.
- Falls and trips occurring due to fainting or fatigue
- Mental and/or physical fatigue leading to errors and mistakes
- Not using personal protection equipment (e.g., earmuffs, safety shoes, overalls, etc.) due to increased
- Discomfort when it is hot
- 'Cutting corners' during work due to fatigue or discomfort
- Heat interacting with other hazards such as chemicals and manual handling
- Burns from contact with hot surfaces or substances

## 2.7. Cold Environments

Working in cold outdoor environments, such as on field trips in the desert and snow conditions, can impose unique hazards and risks to a person undertaking a task/activity in this type of temperature. Sufficient planning using a risk assessment approach is required to ensure that people are not placed at risk in this type of environment.

Working in chillers, freezers and cold rooms may present temperature related risks to staff, students or contractors. Consideration must be given to the following that may affect the degree of risk with cold rooms:

- Temperature
- Air movement
- Length of exposure
- Workers clothing, and
- Physical activity of the worker

Wear appropriate clothing such as wool or other insulating clothing, but ensure it is not too bulky to interfere with work activities or movement around the work area.

The clothing layer closest to the skin should be able to absorb sweat, especially if the activities involve physical exertion such as lifting, while the outside layer should be waterproof. Consideration should also be given to the following:

- Limit handling of frozen or cold items to avoid hands and fingers losing feeling due to cold and wear suitable gloves
- Rotate workers so no one person is in a cold environment for long periods of time
- Consider that some people are more sensitive to cold than others

## 2.8. Cold-related illness

Cold-related illness covers a range of medical conditions that can arise when the body is unable to properly cope with working in cold. These conditions include:

- Hypothermia - a life threatening condition that requires immediate first-aid and medical attention;
- Frostbite - skin, muscle, blood vessels, and nerves freeze and form ice crystals;

- Loss of co-ordination, stiffness or pain, slurred speech and drowsiness, slow, irregular breathing and heartbeat/pulse, shivering

Other health and safety problems caused by cold working conditions include:

- Disease flare-ups such as asthma
- Increase in injuries due to decreased dexterity, mental skills, coordination, and a general decline in performance that affects safety
- Increase the risk of injuries to muscles and tendons, such as strains and sprains
- Inability to perform tasks due to restrictions from PPE
- Burns from contact with cold surfaces or substances
- Slips due to ice

## 2.9. Working in wet weather

As part of their normal duties, or while on field trips, staff and students may be required to work outside in wet weather. Working in wet weather conditions may change the nature of the hazards and risks associated with a particular job or task. To minimise the risk to individuals, a risk assessment should be carried out to analyse the risks associated with wet weather tasks and implementation of appropriate risk control measures.

## 2.10. Air conditioning

In air-conditioned areas, if the air conditioning system is not operating within an acceptable range, report the problem to Property Services. The use of personal fans or heaters in an air-conditioned area where people are experiencing discomfort may exacerbate the situation. It can actually make the area hotter or colder due to interference with the automatic control system of the air conditioning system.

For example, a personal fan may cause a nearby air conditioning thermostat to falsely sense that the room is too cool, consequently increasing the warm air supplied to the room. This exacerbates the already uncomfortably warm environment.

If conditions in non-air-conditioned areas are consistently outside an acceptable comfort range, shading, insulation, mechanical ventilation, heating or air conditioning may be warranted. A risk assessment of the conditions may be required to justify these measures. Operational Leaders are responsible for contacting Property Services to place a works maintenance request.