Guidance Notes on Prevention of Heat Stroke at Work

Occupational Safety and Health Branch
Labour Department

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Labour Department

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1. Introduction

1.1 The hot and humid summer in Hong Kong poses an increased risk of heat stroke to employees working outdoors (e.g. construction, cleaning, security, landscaping, etc.) or in indoor environments that lack air conditioning systems (e.g. electrical and mechanical staff). In addition, employees who are required to work near heat sources or heat-generating facilities (e.g. boilers) are also at risk of heat stroke.

1.2 Under the general duty clauses of the Occupational Safety and Health Ordinance (Cap. 509), employers are required to provide or maintain a working environment and systems of work that are, so far as reasonably practicable, safe and without risk to health. Therefore, employers are required to conduct risk assessments on the heat stress of employees at work, and take appropriate measures based on the assessment results to prevent employees from getting heat stroke at work. If the employer does not have control over the workplace, he must maintain good communication with the occupier of the workplace and ensure that the heat stroke preventive measures are properly implemented. Employees must also abide by the system or work method established by the employer, use any equipment provided by the employer, and comply with relevant prevention and control measures to reduce the risk of heat stroke.

1.3 This Guidance Notes outlines various factors that employers have to consider when conducting risk assessments for employees, including working environment, work nature and personal factors, and introduces preventive and control measures that are applicable to different risk factors. It helps employers implement appropriate preventive and control measures according to the actual work situation, such as arranging suitable work and rest schedules, to reduce the risk of heat stroke posed to employees working in hot environments.

1.4 In view of the varying nature and demands of different industries and job positions, employers and employees should refer to the criteria and recommendations provided in this Guidance Notes early to establish reasonable and mutually agreed work-rest schedules during hot weather based on risks and through consultation.

2. Scope of Application and Definitions

2.1 This Guidance Notes is applicable to work that needs to be carried out under hot weather or in high-temperature environments, such as:

- Work conducted in outdoor locations without shelters;
- Work conducted in indoor locations without air-conditioning system installed;
- Work conducted near heat sources or heat-generating facilities.

2.2 This Guidance Notes mainly provides relevant criteria and recommendations to reduce heat stress and risks of heat stroke in employees at work generally. If employers cannot take appropriate heat stroke prevention measures according to this Guidance Notes due to the unique working conditions and needs of their employees, they should seek the opinion and assistance of occupational health professionals to conduct necessary risk assessment and establish a safe work system to ensure the safety and health of employees working in hot weather.

2.3 The following definitions are used in this Guidance Notes:

- **"Environmental Factors"** – refer to the environmental temperature, relative humidity, air flow (wind speed) and thermal radiation at any workplace.
- **"Work Factors"** – refer to the nature of work of employees at any workplace, including factors such as workload, duration of work and the required personal protective equipment.
- **"Personal Factors"** – refer to the personal health status of employees at any workplace and whether the body has acclimatized to work in a hot environment.
- **"Heat Stress"** – means the stress caused by heat on the human body. The human body will generate heat during physical work. Hot weather hinders the dissipation of heat from the body, thus increasing the level of heat stress and the risk of heat stroke.
- **"Heat Acclimatization"** – means the gradual physiological adaption of the body to enhance the ability to withstand heat stress. For example, for employees who have not been engaged to work under hot weather previously, they should increase their workload to a normal level progressively within a few days, allowing them to gradually adapt to the heat stress at work.

3. Risk Assessment

Employees working in hot weather or high-temperature environments are at risk of heat stroke. To prevent employees from heat stroke at work, employers should conduct appropriate risk assessments for the heat stress of employees at the workplace, and take effective preventive measures according to the assessment results.

To assist employers in conducting heat stress risk assessments, the Labour Department published the "Risk Assessment for Preventing Heat Stroke at Work" as early as 2017. It detailed the risk factors to be considered when conducting risk assessments, and proposed corresponding preventive measures for these factors for employers to refer to and implement for the protection of their employees' occupational health.

In most cases, conducting these risk assessments is not difficult and can be facilitated by using the assessment form provided in this Guidance Notes. Employers may appoint a person who is familiar with the working conditions of the workplace and has basic occupational safety and health knowledge about heat stress to conduct the risk assessment. In addition to considering the various heat stress risk factors (including environmental, work and personal factors), appropriate preventive and control measures should also be recommended based on the different risk factors identified.

3.1 Heat Stress Risk Factors

When situated in a hot environment, the body will increase blood flow to the skin and perspire to dissipate heat. If the temperature of the environment is too high or a large amount of heat is generated by physical work, and the body's physiological regulating mechanism fails to control body temperature effectively, it will increase heat stress thus leading to a higher risk of heat stroke.

Employers should consider various risk factors, including temperature, humidity, heat radiation, air flow, workload, work clothing, employees' health status, and their adaptation to working in a hot environment, while carrying out risk assessment of heat stress in the workplace.

3.1.1. Environmental factors

Environmental factors including ambient temperature, relative humidity, heat radiation and air flow at the workplace are often the most concerned factors. As the temperature, humidity, and heat radiation at the workplace increase, the heat stress experienced by employees during work will increase. In addition, the lower the ventilation or air flow at the workplace, the higher the heat stress experienced by the employees.

3.1.2. Work Factors

Apart from environmental factors, the level of physical exertion in work can also affect an employee's heat stress. Physical exertion accelerates metabolism, causing the body to produce more heat and increasing the risk of heat stress.

Furthermore, the clothing and personal protective equipment worn by employees can also hinder heat dissipation. Thick clothing and non-breathable protective clothing both hinder the body to dissipate heat. Hence, these factors must also be considered when assessing the risk of heat stress.

3.1.3. Personal Factors

Employees who have never worked in hot and humid environments are less capable of withstanding heat stress than those who are acclimatized to such conditions. Additionally, if employees have not worked in hot and humid environments for a period of time (e.g. more than two weeks), their ability to tolerate heat stress will also significantly decrease. These employees have a relatively higher risk of heat stroke at work and this factor must be considered in heat stress risk assessment. If such employees need to work in hot and humid environments, a heat acclimation period should be arranged during which the employees increase the working time in the hot environments progressively to facilitate their gradual adaptation (please see section 4.5).

Furthermore, if employees have underlying health conditions such as heart disease, hypertension, or are taking certain medications, they may have an increased risk of heat stroke while working in hot environments. If they have doubts about whether their health condition is suitable for working safely in high temperatures, they should consult their doctors, inform their employers of any relevant advice and discuss with them about the appropriate work arrangements.

3.2 Measuring Heat Stress in Workplace

Currently, there are a number of methods for evaluating heat stress. The following two methods for measuring heat stress are introduced for the reference of employers / responsible persons.

3.2.1. Wet Bulb Globe Temperature (WBGT) Index[1]

The Wet Bulb Globe Temperature (WBGT) is an indicator recognised by many organizations in the Mainland and overseas countries for assessing the heat stress on the human body in hot environments.

WBGT index takes air temperature, relative humidity, wind speed and heat radiation into consideration. If the person responsible for a workplace believes that the employees are facing high levels of heat stress while working, they may seek the assistance of occupational health professionals to measure the WBGT index at the workplace as the basis for assessing the heat stress of employees and formulating necessary preventive measures to minimize the risk of heat stroke of employees at work.

[1] The Wet Bulb Globe Temperature index is a heat stress assessment method adopted by the National Standard of the People's Republic of China (GBZ/T 189.7-2007), the International Organization for Standardization (ISO 7243:2017), the British Standard (BS EN ISO 7243:2017) and American Conference of Governmental Industrial Hygienists (ACGIH).

3.2.2. Hong Kong Heat Index (HKHI)[2]

The Hong Kong Heat Index (HKHI) is a heat stress index developed through joint research by the Hong Kong Observatory and the Faculty of Medicine of the Chinese University of Hong Kong based on the Wet Bulb Globe Temperature Index. The calculation formula for the HKHI includes meteorological data such as environmental temperature, humidity, air flow, and solar radiation levels, and has taken the overall hospital admission figures in Hong Kong into consideration. Therefore, the HKHI can appropriately reflect the health risks posed to the entire population in Hong Kong as a result of the heat stress. Generally speaking, when the HKHI in King's Park reaches 30 or above, citizens should take appropriate measures to prevent the health effects caused by hot weather.

As the Wet Bulb Globe Temperature Index or other methods of gauging heat stress require the use of measuring instruments, while the Hong Kong Observatory will publish the value of the Hong Kong Heat Index[3] through its website, employers or responsible persons may refer to the values of the Hong Kong Heat Index as an easier and more convenient means of assessing the risk of heat stroke faced by employees at work.

3.2.3. Heat Stress at Work Warning

In order to facilitate employers and employees in understanding the level of heat stress when working outdoors or in indoor environments without air conditioning system, the Labour Department has established a system of Heat Stress at Work Warning coded amber, red, and black, indicating the level of heat stress that employees face when working outdoors or in indoor environments without air conditioning system. Please refer to the table below for more details:

<table>
<tr><th>Hong Kong Heat Index</th><th>Heat Stress at Work Warning</th><th>Warning Signs</th></tr>
<tr><td rowspan="2">30 to <32</td><td>Amber</td><td> 
</td></tr>
<tr><td colspan="2">Amber Heat Stress at Work Warning indicates the level of heat stress in certain work environments is high.</td></tr>
<tr><td rowspan="2">32 to <34</td><td>Red</td><td> 
</td></tr>
<tr><td colspan="2">Red Heat Stress at Work Warning indicates the level of heat stress in certain work environments is very high.</td></tr>
<tr><td rowspan="2">>=34</td><td>Black</td><td> 
</td></tr>
<tr><td colspan="2">Black Heat Stress at Work Warning indicates the level of heat stress in certain work environments is extremely high.</td></tr>
</table>

[2] K.L. Lee, Y.H. Chan , T.C. Lee, William B. Goggins & Emily Y.Y. Chan, The development of the Hong Kong Heat Index for enhancing the heat stress information service of the Hong Kong Observatory, International Journal of Biometeorology, November 2015.

[3] https://www.hko.gov.hk/en/wxinfo/ts/display_element_hkhi.htm

When the Heat Stress at Work Warning is in force (please refer to paragraph 5.1.1 for details), hourly updates will be sent out automatically. If the Heat Stress at Work Warning reaches a higher level, an earlier update will be issued. Employers have to make appropriate arrangements for rest periods based on the level of physical exertion in work in the hour following the announcement of the Heat Stress at Work Warning and the hourly updates announcing the continued effectiveness of the warning.

3.3 Assessing and Recording Risks of Heat Stress

Employers should properly control and manage the risk of heat stress in the workplace. **Appendix 2** of this Guidance Notes provides a template, which includes the Heat Stress at Work Warning as a criterion for "Workplace Heat Stress Risk Assessment". Employers may use **Appendix 2** to assess the risks of employees facing heat stress usually in their work and take necessary preventive measures based on the assessment results, including providing necessary rest periods or suspending work to safeguard employees' occupational safety and health. Employers should inform employees of all measures listed in the risk assessment as early as possible and provide relevant information, instruction, training, and supervision. Additionally, employers should keep written records of the above risk assessment.

If employees are engaged in work of varying levels of physical demand in different work environments (see **Appendix 1**), they may face different levels of heat stress. Therefore, employers should use the form in **Appendix 2** to conduct different risk assessments for the employees' different job duties.

Appendix 3 provides some reference examples for using the risk assessment form.

4. Preventive and Control Measures

In general, the human body can regulate its temperature by increasing perspiration and breathing rate to dissipate heat. However, in hot and humid weather or high-temperature environments, the body has greater difficulty to dissipate heat, leading to physiological responses such as elevated body temperature and increased heart rate. If the body persistently cannot regulate its temperature in a proper manner, heat exhaustion or even heat stroke may occur, which can be fatal in severe cases. Employees engaged in work of high physical demand have higher metabolic rates, producing more heat energy, thus increasing the risk of heat stroke during work.

In order to prevent employees from suffering heat stroke while working, employers should refer to the recommendations in Chapter 3 of this guidance notes and conduct a heat stress risk assessment for their employees' work. Based on the identified risk factors, employers should, so far as reasonably practicable, take corresponding and effective risk control measures.

This chapter will elaborate on various heat stress risk control measures for reference and application by employers and employees.

4.1 Supply Cool Drinking Water

4.1.1 When working in a hot environment, the body increases perspiration to regulate body temperature, leading to rapid loss of body fluids. Failure to replenish lost fluids in a timely manner increases the risk of heat stroke for employees. According to Section 16(1) of the Occupational Safety and Health Regulation (Chapter 509A), the person responsible for the workplace must ensure that there is sufficient drinking water available for employees working at that workplace. Therefore, the responsible person must arrange for adequate drinking water supply at all times during work.

4.1.2 To enable employees to effectively lower their body temperature, the responsible person should provide cool drinking water to employees based on the actual situation. In addition, employees working in a hot environment should actively replenish water often to avoid dehydration. If water is only drunk when feeling thirsty, dehydration may have already occurred, and the risk of heat stroke would be increased as a result. In general, employers should provide employees with about 250 to 500 millilitres of drinking water per hour. When employees work in a hot environment, however, they may lose more fluids due to sweating. As such, employers should take such circumstances into consideration and suitably increase the supply of drinking water.

4.1.3 Employers should assess the necessary increase in drinking water based on the risk assessment results of employees' physical workload, environmental factors, and individual factors. If employees are at high risk of heat stress while working, they should be advised to drink approximately 250 millilitres of cool drinking water every 15 to 20 minutes, which is about 750 to 1,000 millilitres of cool drinking water per hour (but no more than 1,500 millilitres of water per hour to avoid lowering the salt concentration in blood to subnormal level).

4.1.4 Furthermore, employers should arrange for their employees to have access to drinking water within 10 minutes of walking to facilitate their replenishment of water.

4.1.5 During perspiration, the body not only loses water but also salt. For employees who need to work in hot environments for more than two hours, employers may consider providing drinks with electrolytes (such as sodium ions and potassium ions) to enable employees to replenish electrolytes appropriately.

4.1.6 Additionally, the responsible person of the workplace should never provide alcoholic beverages as an option for replenishing body fluids to avoid increasing the risk of heat stress for employees while working.

4.2 Reduce Heat Absorption

4.2.1 Reducing the absorption of heat by employees while working is one of the important methods to prevent heat stroke. Employers need to assess the risk of heat stress on employees brought about by heat sources or direct sunlight exposure at the workplace. They should then develop effective measures to reduce employees' prolonged exposure to high level of heat in work environments.

Heat Source

4.2.2 Common heat sources in workplace include naked flames from cooking stoves, gas welding, flame cutting, and cooling systems. Employers should assess the potential risk of heat stress experienced by their employees and develop effective measures and/or provide personal protective equipment to reduce heat absorption based on the actual situation. These measures include relocating or isolating devices or equipment that generate heat and hot air, extracting hot air from the workplace, and providing personal protective equipment to employees.

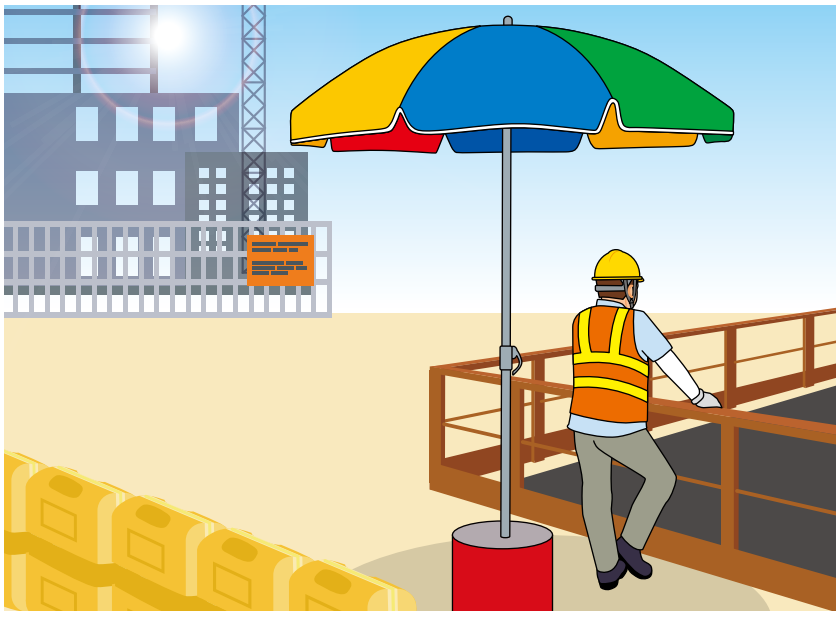
4.2.3 For work processes performed under high heat, such as metal melting and casting, employers must install appropriate mechanical devices, such as exhaust systems and insulation, to regulate the temperature of the employees' work area. In addition, the high levels of heat radiation emitted during these processes can damage the skin and eyes of employees. Therefore, employers should provide suitable personal protective equipment for heat protection and insulation (such as protective hoods, goggles, gloves and protective clothing that can reflect heat radiation with shiny surface and provide insulation) to minimize the risks to employees during work.

Sunlight

4.2.4 Employees who work outdoors need to be particularly mindful of the heat radiation that is absorbed from exposure to direct sunlight. Employers/ responsible persons should, so far as reasonably practicable, provide shade or cover to block the sunlight for employees who work outdoors for extended periods. The shade or cover should shelter most of the body of the employees from direct sunlight in order to minimize the amount of heat radiation they absorb.

Set up shade / cover for blocking sunlight

4.2.5 When employees are working outdoors at temporary locations, or when it is not feasible to provide shade or sun-blocking cover, employers or responsible persons should consider the appropriate use of sunshade/parasol to minimize direct exposure to sunlight for employees.



Set up sunshade / parasol at temporary working locations

4.2.6 Furthermore, employers should provide appropriate sun protection equipment for employees (e.g. wide-brimmed hats, safety helmets with neck shades, cooling towels, sun protection sleeves, etc.) to block sunlight and reduce the absorption of heat radiation from the environment.

4.3 Increase Heat Dissipation

Air conditioning system or ventilation equipment

4.3.1 Air conditioning system can reduce the temperature and humidity of the environment, helping employees in heat dissipation and reducing heat stress. In the event that provision of air conditioning is not feasible due to particular circumstances or limitations of the working location, employers may install blowers or misting fans[4] to enhance air flow and promote heat dissipation. If it is difficult to install blowers or misting fans (such as in locations without power or adequate space), or if employees need to work in different locations, employers should also provide portable fans (preferably waist fans) to employees to facilitate heat dissipation and decrease heat stress.

Clothing

4.3.2 Employees should wear light-coloured, thin, and loose-fitting clothing as far as possible when working in hot environments. This can reduce heat absorption and facilitate the dissipation of body heat. Breathable clothing with good sweat-wicking dry-fit properties can effectively remove moisture from the skin and increase evaporation and heat dissipation. If employers need to provide work clothes for employees, they should strive to meet the above clothing/material specifications. In addition, employers should provide outdoor workers with sun protection sleeves that have good sweat-wicking and dry-fit properties. This will not only block the radiant heat from the sun and help heat dissipation through sweat evaporation locally, but also avoid sunburn on the arms.

4.3.3 If an employer is unable to provide the equipment mentioned above, they should also consider providing employees with cooling vest that contains frozen packs or refrigerating devices to reduce the risk of heat stroke among employees.

4.4 Reduce Physical Exertion

4.4.1 When performing physically demanding work, an increase in metabolism and heat production can lead to elevated heat stress. Employers or responsible persons should provide suitable mechanical aids (such as hand trucks, pallet jacks, lifting devices, etc.) for employees to use, or instruct employees to take other appropriate measures (such as team lifting) to minimize physical exertion, thereby reducing heat stress. If employees need to engage in heavy physical work for long periods or at a rapid pace, they should be arranged to rotate work or have different employees to perform the work in turn to reduce the physical demand and pace of work.

[4] Using misting fans indoors can increase humidity in the environment, which can affect the heat dissipation effect. Therefore, misting fans are generally more suitable for use in outdoor environments.

4.5 Arrange Heat Acclimatization

4.5.1 Employees can experience physiological changes such as an increase in body temperature and heart rate due to heat stress when working in hot environments. The acclimatization period allows employees to gradually adapt to the hot work environment and their body's responses, and make corresponding physiological adjustments.

4.5.2 If an employee has not worked in a hot environment for more than a month or has never worked in such environment, the employer should arrange a minimum acclimatization period of five days to allow the employee to fully adapt to working in a hot environment. On the first day, the employee's work in a hot environment should not last for more than 20% of the normal working time in such environment. The working time can then be increased by 20% of the normal working time in hot environment each day until the employee fully adapts and can work normally in the hot environment.

4.5.3 If an employee has not worked in a hot environment for two weeks to one month, the employer should also arrange a minimum acclimatization period of four days when the employee returns to work to allow them to re-adapt to working in a hot environment. On the first day, the employee's work in a hot environment should not last for more than 50% of the normal working time in such environment. The working time of the employee can then be increased stepwise by 20% of the normal working time in hot environment each day until it returns to the normal working time in hot environment.

4.5.4 Previous studies have shown that more than half of the heat stroke fatalities involved workers who were un-acclimatized to working in hot environments, leading to accident occurrence during their first few days of work. Therefore, employers should pay special attention to the heat stress risks of employees who have not completed the acclimatization process and ensure that sufficient control measures have been taken.

4.6 Arrange Working Hours

4.6.1 In hot summer days, employers should schedule outdoor and physically demanding work to cooler daytime periods (e.g. before 10 a.m. or after 4 p.m.) as far as reasonably practicable. Alternatively, they can arrange for employees to work alternately in hotter and cooler environments to avoid increasing the risk of heat stroke among employees as a result of extended periods of work in hot and humid environments. This approach can also minimize the impact on work processes and progress.

4.7 Arrange Rest Time and Place

4.7.1 As stated above, physical work generates heat and increases heat stress. To reduce heat stress during work, employers should provide rest breaks for employees to recuperate, drink water and cool down their body, whenever reasonably practicable. For instance, employers should let employees performing light to moderate levels of physical work have a minimum of a 10-minute rest break after every 2 hours of work, while employees performing heavy to very heavy levels of physical work should be given at least a 15-minute rest break after every 2 hours of work (If the Heat Stress at Work Warning is in effect, employers should provide more rest time as recommended in section 5.5 of this Guidance Notes.). If employees are not acclimatized or need to re-acclimatize to working in hot or high-temperature environments, additional rest breaks should be arranged for these employees. In addition to considering heat stress during work, employers should also arrange suitable rest break for employees based on other risk factors (such as physical fatigue, etc).

4.7.2 Employers should adopt a risk-based approach and increase the rest breaks of relevant employees with increasingly hot weather. Employers can divide the required rest breaks into shorter but more frequent periods, depending on the working conditions.

4.7.3 Apart from rest breaks, the location of the rest area is equally important in managing heat stress. If employees can rest in a cool place, heat stress can be alleviated more quickly. Employers / responsible persons should set up or arrange shaded areas for employees performing outdoor work to sit down and rest. If shaded rest areas are not available, employees may require longer breaks to alleviate heat stress. In remote and off-grid working locations, employers or responsible persons may consider installing mobile cooling stations for relevant employees to use. Rest areas should have good ventilation or, better still, air conditioning, if available.

5. Work / Rest Arrangements in Times of Heat Stress at Work Warning

This chapter outlines how employers should develop suitable work / rest schedules for employees to reduce the risk of heat stroke at work when the Heat Stress at Work Warning is in force.

As indoor work environments equipped with air conditioning systems are generally not affected by outdoor heat waves, the hourly work and rest schedules recommended below in response to the Heat Stress at Work Warning do not apply to indoor work environments with an operating air conditioning system. In addition, the rest schedules are not applicable to work which needs to be performed urgently or continuously for production and operation process, personal and property safety or public interest, such as firefighting, emergency rescue, or urgent repair work.

5.1 Heat Stress at Work Warning Issued

5.1.1 The Heat Stress at Work Warning is developed and issued by the Labour Department, with the assistance of Hong Kong Observatory in producing and transmitting the message. The issuance, update or cancellation of the warning is automatically generated through a computer system based on the Hong Kong Heat Index data, without manual intervention under normal circumstances. The entire process usually takes about 10 to 20 minutes. When different levels of Heat Stress at Work Warning (for details, please refer to paragraph 3.2.3) are in force, the Hong Kong Observatory will display relevant information on the homepage of its official website and the "My Observatory" mobile application. The public can also receive details of the Heat Stress at Work Warning by allowing push notifications from "My Observatory" mobile application (please refer to the example at **Appendix 6**). In addition, the Labour Department will issue prompt message to the public regarding the coming into effect of Heat Stress at Work Warning through press releases and the "GovHK Notifications" mobile application.

5.1.2 After the issuance of a Heat Stress at Work Warning, updates will be provided every hour. If a higher level of Heat Stress at Work Warning appears in the meantime, the update will be made earlier. The public can choose to receive hourly push notifications through the "My Observatory" or the "GovHK Notifications" mobile applications to learn whether the warning is still in effect. In addition, various electronic media will also disseminate relevant information through appropriate channels.

5.2 Hourly Work / Rest Arrangements

5.2.1 When the Heat Stress at Work Warning is in effect, employees who work outdoors or in indoor environments without air conditioning will face high levels of heat stress. Employers are required to arrange rest breaks for affected employees every hour as far as reasonably practicable to prevent heat stroke.

5.2.2 **Appendix 4** lists out the recommended hourly rest periods for employees working outdoor at different levels of physical workload (as defined in **Appendix 1**) under different Heat Stress at Work Warning levels. These recommendations are based on the outdoor working environment and physical workload of employees without regard to other risk factors that may affect the required rest periods (section 5.4), and the heat stroke preventive measures (section 5.3) that have already been taken.

5.3 Conditions for Reducing Rest Time

Indoor environment[5]

5.3.1 The heat stress experienced by employees working in indoor locations without air conditioning is closely related to outdoor heat conditions. However, as there is no radiant heat from direct sunlight in indoor working environments, the hourly rest time for employees working indoors without air conditioning can be reduced by 15 minutes compared to those working outdoors with the same physical workload.

Shelter facilities

5.3.2 When employers or responsible persons provide employees who work outdoors for long periods in a fixed location with shelter or sun-blocking cover (including sunshade that can shade most part of the body), the radiant heat from direct sunlight is reduced, and the heat stress experienced by employees during work will be decreased. As a result, the hourly rest time for such employees can be reduced by 15 minutes.

Increase air flow / dissipation of heat

5.3.3 If employers or responsible persons increase ventilation at employees' working locations or provide heat dissipation devices such as blowers, misting fans, or portable fans that enhance air flow, the heat stress experienced by employees can be effectively reduced. As a result, the recommended hourly rest time for employees can also be reduced by 15 minutes. If providing such equipment is not feasible, providing employees with cooling vest containing frozen packs or refrigerating devices can also reduce hourly rest time by 15 minutes.

Providing shelters and heat dissipation measures simultaneously

5.3.4 If employers or responsible persons simultaneously provide the above mentioned shelters and heat dissipation devices (or cooling vest) to employees to reduce heat stress, the hourly rest time for employees during Heat Stress at Work Warning can be reduced by a total of 30 minutes.

[5] Indoor work environments with air conditioning systems are generally not affected by outdoor heat waves, therefore, the hourly work and rest schedule recommended in the guideline for Heat Stress at Work Warnings does not apply to these types of indoor environments.

5.4 Conditions for Increasing Rest Time

Heat sources or heat-generating facilities

5.4.1 When there are obvious heat sources or heat-generating facilities near working location, and facilities are lacking at the working location to remove hot air / humidity or isolate heat effectively, such as in the following situations, the hourly rest time for employees should be increased by 15 minutes:

(a) No effective devices installed in the kitchen to remove the hot air and humidity generated by cooking process;

(b) No exhaust device used to remove the hot air generated during gas welding or flame cutting processes;

(c) No heat shield installed for heat-generating facilities near the working location, which results in higher temperatures at the working location.

Poor ventilation

5.4.2 Some working locations lack adequate natural ventilation, such as enclosed rooms or enclosed renovation sites with poor natural ventilation. If no effective ventilating facilities are installed, the recommended hourly rest time for employees should be increased by 15 minutes.

Protective clothing

5.4.3 If employees need to wear non-breathable protective clothing during work, it can hinder the body's heat dissipation and increase heat stress. Therefore, the hourly rest time should be increased by 15 minutes.

Non-breathable protective clothing

Unacclimatized to heat

5.4.4 If the employees are unacclimatized or need to re-acclimate to hot work environment, such as not having worked in a hot environment in the past or for more than two weeks, in addition to following the arrangements regarding the acclimation period as described in section 4.5, employers should increase the hourly rest time for such employees by 15 minutes when Heat Stress at Work Warning is in effect.

Multiple risk factors

5.4.5 If two scenarios as described in paragraphs 5.4.1 to 5.4.4 are present, the hourly rest time should be increased by a total of 30 minutes. If three scenarios are present simultaneously, the hourly rest time should be increased by a total of 45 minutes. If all four scenarios are present, the hourly rest time should be increased to 60 minutes (i.e. relevant work must be suspended for that hour).

5.5 Overall Adjustment of Rest Time

5.5.1 Employers should record the various factors that can increase or decrease the recommended rest time per hour based on the result of the risk assessment, and then calculate the adjustment of the recommended hourly rest time accordingly.

Conditions for reducing rest time	**Adjustment of hourly rest time**
☐ Work in indoor environment or set up shading facilities (such as shelter or sun-blocking cover)	☐ -15 mins
☐ Provided devices to facilitate heat dissipation (blowers/ misting fans/ portable fan/cooling vest containing frozen packs or refrigerating devices)	☐ -15 mins
Conditions for increasing rest time	
☐ Existing heat source/ heat-generating facilities at working location without effective heat shielding or exhaust ventilation for hot air/moisture	☐ +15 mins
☐ Poor natural ventilation at the workplace and without effective ventilation equipment	☐ +15 mins
☐ Need to wear non-breathable protective clothing	☐ +15 mins
Adjustment of rest time	**Increase / Decrease* _____ min**

* Please delete if inappropriate

5.5.2 Employers can calculate the actual hourly rest time for employees under different levels of Heat Stress at Work Warning based on the recommended rest time per hour in **Appendix 4** and the necessary adjustments derived from the overall consideration of various factors mentioned above.

<table>
<tr><th colspan="4">Rest time corresponding to the physical workload of employees
under different Heat Stress at Work Warnings</th></tr>
<tr><td colspan="4">Employee position: _____
Job nature: _____</td></tr>
<tr><td>Physical workload categories
(Appendix 1)</td><td>Warning levels</td><td>Hourly rest time
before adjustment
(Appendix 4)</td><td>Hourly rest time
after adjustment**</td></tr>
<tr><td rowspan="3">☐ Very heavy
☐ Heavy
☐ Moderate
☐ Light</td><td>Amber Heat Stress at Work Warning</td><td>_____ min</td><td>_____ min</td></tr>
<tr><td>Red Heat Stress at Work Warning</td><td>_____ min</td><td>_____ min</td></tr>
<tr><td>Black Heat Stress at Work Warning</td><td>_____ min</td><td>_____ min</td></tr>
<tr><td colspan="2" rowspan="2">Are the employees unacclimatized / required to re-acclimatize to work in hot environments?</td><td colspan="2">☐ Yes: Additional 15-minute rest time per hour to be given to relevant employees (based on the adjusted hourly rest time above)</td></tr>
<tr><td colspan="2">☐ No</td></tr>
</table>

** If the adjusted hourly rest time is zero or negative, the employer should still arrange for the employees to rest for 10 to 15 minutes every two hours of work in accordance with paragraph 4.7.1.

5.5.3 If employers take various effective measures to prevent the occurrence of relevant risk factors, the required rest time per hour can be decreased. In addition, employers should formulate in advance the hourly work-rest schedules for different categories of employees under different levels of Heat Stress at Work Warning, so that hourly rest periods can be arranged for employees in an orderly manner when Heat Stress at Work Warning is in force. This will not only reduce the risk of heat stroke among employees but also minimize the impact on the overall work flow and progress.

5.5.4 When the adjusted hourly rest time for employee become zero min after implementation of all heat preventive measures, the employers should still follow the recommendation in paragraph 4.7.1 to arrange at least 10 minutes of rest for every 2 hours of work for employees performing light to moderate level of physical work , and at least 15 minutes of rest for every 2 hours of work for employees performing heavy to very heavy level of physical work to let them recuperate, drink water and cool down their body.

5.5.5 Employers should also ensure that employees adhere to the relevant rest arrangements, in addition to establishing suitable work-rest schedules for them. Employees should follow the instructions to take rest as scheduled and avoid skipping rest periods to finish work early. Employers and employees need to collaborate and work together to effectively prevent heat stroke at work.

6. Recognition and Treatment of Heat-Related Illness

Heat-related illnesses (including heat cramps, heat syncope, heat exhaustion, and heat stroke) are health damage and symptoms that arise when the body's physiological mechanism in temperature regulation is overwhelmed in hot weather or high temperature environments. Employers and employees should take appropriate precautions to avoid heat-related illnesses when working in hot environments.

6.1 Early Recognition of the Symptoms of Heat-Related Illness

Heat stroke can occur rapidly and is life-threatening. Therefore, employers should provide employees with information and training on heat-related illness and arrange regular drills so that employees can identify related symptoms early and take appropriate responses immediately.

Common early signs and symptoms of heat-related illness

Signs	Symptoms
Overall appearance: Nausea or vomiting Fatigue and weakness	**Overall feeling:** Fatigue Headache Thirsty Nausea (feel like vomiting)
Reaction and conscious level: Confusion Syncope Unconscious	**Reaction and conscious level:** Dizziness
Breathing: Rapid and shallow breathing	**Breathing:** Rapid breathing Breathing difficulty
Blood circulation: Rapid and weakening pulse	**Blood circulation:** Palpitation
Other symptoms: Muscle cramp (especially in feet and abdomen) * Clammy skin, excessive sweating, and pale (common in heat exhaustion) * Dry skin, flushing, fever and without sweating (common in heat stroke)	**Other feelings:** Cramps and pain in the arms, legs and abdomen Increase in body temperature

Note: Signs and symptoms of heat-related illness may vary in different individuals. The absence or presence of sweating should not be solely used as a hint of heat stroke and criterion for first aid treatment. Generally speaking, employees are at risk of heat stroke if they work for a long time or engage in heavy physical work in hot environments. If the mentioned signs and symptoms appear, seek help as soon as possible, cool down the affected worker, and provide appropriate first aid treatment according to the affected worker's condition.

6.2 First Aid Treatment for Heat-Related Illness

Heat stroke can develop and worsen quickly. Therefore, initial first aid treatment must be provided to the affected worker, with a priority on cooling down the patient until his/her condition improves or the ambulance arrives.

Management

- Immediately notify the supervisor, act according to the organization's established emergency response plan, and seek help from colleagues and medical personnel
- Move the affected worker to a shaded, cool and well–ventilated place to sit or lie down as soon as possible
- Assess the consciousness of the affected worker for appropriate first aid treatment

Note: After the initial assessment, it is important to maintain close monitoring of the affected worker for any deterioration.

Check Alertness

Fully Conscious	Not Fully Conscious
• Fully awake with spontaneous eye opening; • Speech is organized and able to answer questions clearly such as person, place and time	• Eyes are opened by sound stimulation or no response; or • Disorganized speech or inability to answer own name, place or time; or • Does not respond to any stimuli

First Aid Management

Fully Conscious

- Cool down the patient as quickly as possible:
  - ◎ Place the patient in a cool or air-conditioned place
  - ◎ Loosen or remove clothing as appropriate from the patient
  - ◎ Sprinkle water on the patient, and then use a fan or electric fan to help evaporate water and lower the body temperature
  - ◎ Continuously wipe the body with a sponge/towel moistened with cold water to cool down
  - ◎ Place a sponge/towel moistened with cold water on both underarms and groin to help cool down
  - ◎ Give cool drinking water or an electrolyte drink
- Continuously monitor the patient responses to cooling, and if tremors occur, stop immediately and cover him/her to keep warm
- Cool down the patient until conditions improve or the ambulance arrives

Not Fully Conscious

- Check and maintain "airway patency", "breathing", "blood circulation" and at the same time cool down the patient as soon as possible:
  - ◎ Place the patient in a cool or air-conditioned place
  - ◎ Loosen or remove clothing as appropriate from the patient
  - ◎ Sprinkle water on the patient, and then use a fan or electric fan to help evaporate water and lower the body temperature
  - ◎ Continuously wipe the body with a sponge/towel moistened with cold water to cool down
  - ◎ Place a sponge/towel moistened with cold water on both underarms and groin to help cool down
  - ◎ **DO NOT give drinks**
- If the patient is unconscious, he/she should be placed in Recovery Position (Figure 1), and continue to check his/her breathing and pulse and cool him/her down until the ambulance arrives.
- Continuously monitor the patient responses to cooling, and if tremors occur, stop immediately and cover him/her to keep warm
- If the patient has cardiac arrest, perform Cardiopulmonary resuscitation (CPR) immediately
- Send the patient to the hospital as soon as possible

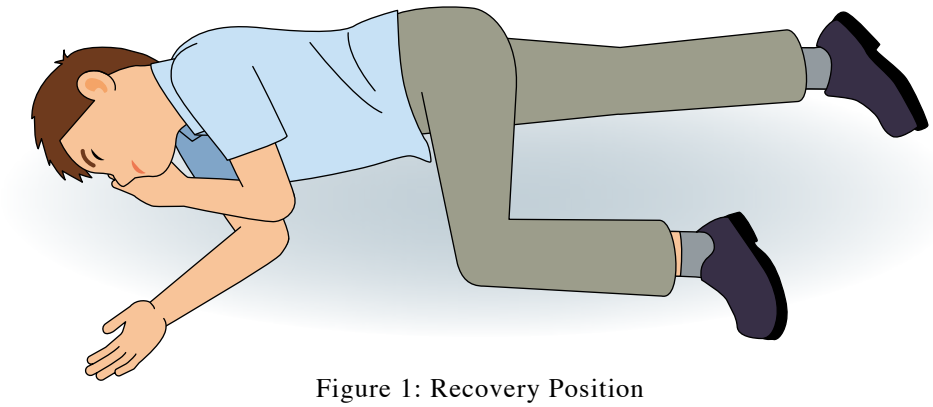


Figure 1: Recovery Position

If the patient is breathing but unconscious and the spine is not injured, he/she should be placed in the recovery position to prevent the tongue from falling back and blocking the airway. At the same time, it facilitates the secretion or vomit to flow out of the mouth and reduce the risk of airway obstruction or aspiration pneumonia.

Employees should be familiar with the first aid and emergency response at the workplace and conduct regular drills in order to improve the ability of providing initial first aid to employees suffering from heat-related illnesses, thereby reduce the risk of injury or death.

First Aid Training

Below are some organizations that provide first aid certificate courses recognised by the HKSAR Government. Check out the details from their websites below.

Hong Kong St. John Ambulance: www.stjohn.org.hk
Hong Kong Red Cross: www.redcross.org.hk
Occupational Safety & Health Council: www.oshc.org.hk
The Auxiliary Medical Service: www.ams.gov.hk

6.3 Notification of Accidents

The Employees' Compensation Ordinance (ECO) stipulates that if any accident results in the injury or death of an employee, the employer must notify the Commissioner for Labour within the prescribed time limits after the accident (See **Appendix 5**). Heat stroke is the health damage that occurs when the body temperature control mechanism is overwhelmed under hot weather or in a hot environment. Therefore, if an employee suffered from heat stroke by accident while working in a hot environment, it will be considered and handled as work injury.

7. Information, Instruction, Training and Supervision

According to Section 6 of the Occupational Safety and Health Ordinance (Cap. 509), employers must, so far as reasonably practicable, ensure the safety and health at work of all employer's employees, including providing the necessary information, instruction, training and supervision.

7.1 Provision of Information, Instruction and Training

7.1.1 Prevention is the most important method to avoid heat-related illness among employees. Employers should provide employees with information, instruction and training on the prevention of heat-related illness, which should include the following:

- Recognising the potential risks of working in a hot environment;
- The hazards of heat stress and related preventive measures;
- Methods for timely replenishing fluids;
- Identifying risk factors, symptoms and signs of heat-related illness; and
- Procedures for seeking help when feeling unwell, etc.

7.1.2 Employers should also provide relevant training to the safety personnel of the workplace (such as work supervisors, site managers, factory managers, or safety managers) to ensure they have adequate understanding of the prevention of heat-related illness in employees, which should include the following:

- Relevant laws and responsibilities;
- Methods for assessing the risk of heat stress;
- Methods for monitoring hot working environments;
- Physical workload and the risk of heat-related illness;
- Individual factors and the risk of heat-related illness;
- Emergency response measures; and
- First aid procedures for heat-related illness.

7.2 Supervision and Safety Management System

7.2.1 As the heat level in work environments may change fast, suitable adjustment of the heat stress control measures by the workplace management is of utmost importance. The management are responsible for monitoring the hot working environment throughout the day, including the status of "Heat Stress at Work Warning" issued, and implementing preventive and control measures that the employer has developed in accordance with prior risk assessments.

7.2.2 In an ideal scenario, the personnel responsible for implementing preventative and control measures should be present at the employee's work site. However, in industries with widely distributed workforce, such as postal or courier services, on-site monitoring may not be feasible or reasonable. Therefore, on-site employees should undergo comprehensive training to understand the correct channels for contacting and receiving instructions from responsible personnel, and report any adverse conditions for increased heat stress or heat-related illness to their supervisors in a timely manner.

7.2.3 Please note that the work / rest arrangements recommended in Chapter 5 are not applicable to work that needs to be performed urgently or continuously for production and operation process, personal and property safety or public interest (such as firefighting, emergency rescue, or urgent repair work). Relevant employers/ responsible persons should develop necessary control measures in advance for employees engaged in such work to prevent heat stroke while performing relevant duties.

7.2.4 Since the working environments and needs of different job positions in different industries are not the same, and the heat stress faced by employees are also different, employers and employees should collaborate in formulating reasonable and feasible preventive measures and plans. Generally speaking, the safety committee under the safety management system of an organization is an appropriate platform for employers and employees to jointly discuss, make recommendations and optimize heat stress preventive and control measures.

Appendix 1

Physical Workload Categories and Examples[6]

Categories	Examples
Rest	• Resting, sitting at ease
Light	• Light arm and leg work while sitting or standing, such as - writing, typing, drawing, sewing - driving normal vehicle, operating foot pedal - inspection, sorting or assembly of light materials - operating low-powered tools or machines for drilling or sawing work, etc • Performing light tasks while walking (~2 km/h) on a level, even path (Carrying with load not more than 20 kg) Industry examples: Security guard, property management officer, traffic commander, etc.
Moderate	• Sustained hand and arm work or working with hand and arm, leg or trunk, such as - manipulating hand tool for cutting, hammering nails, filing and polishing - working with pneumatic breaker, plastering or brick laying work - off-road operation of lorries, tractors or construction equipment - weeding, hoeing, picking fruits or vegetables - loading or unloading goods, pushing or pulling lightweight carts • Walking (~2 to 5 km/h) on a level, even path or walking (~2.5 to 3 km/h) on levelled but irregular ground, or walking (<2.5 km/h) on stable ground uphill with inclination ≤5% (Carrying with load not more than 20 kg) Industry examples: Chef, cleaning worker, disinfection worker, gardener, recycling worker, container operator, freight forwarder, delivery worker, postal and courier staff, mechanical and electrical worker, painter, plasterer, excavator operator, etc.
Heavy	• Intense arm and trunk work with hand tools or machines or carrying heavy object, such as - shovelling or chiselling work - mixing, pouring, and compacting concrete using a concrete vibrator - pushing or pulling heavily loaded hand carts or wheelbarrows • Walking (~5.5 to 7 km/h) on a level, even path or walking (~3.5 to 5 km/h) on levelled but irregular or unstable ground (Carrying with load not more than 20 kg) • Walking (~2.5 to 3 km/h) uphill with inclination ≤5%) (Carrying with load not more than 10 kg) Industry examples: Porter, carpenter, concrete worker, grouter, etc.
Very Heavy	• Intense activity at rapid pace - shovelling or digging at a fast pace - continuously heavy manual handling work or rebar-fixing work • Walking (~> 7 km/h) on a level, even path or walking (~> 5 km/h) on a levelled but irregular or unstable ground • Walking (~≥ 3 km/h) uphill with inclination ≥5%) or walking up stairs • Running (≥ 6 km/h) Industry examples: Bar-fixing worker, scaffolder, employees undergoing physical training, etc.

Note: The above examples of industries are based on general working conditions of individual occupations and are for reference only. Employers should make reasonable judgments based on the actual job nature of their employees in the risk assessment.

[6] BS EN ISO 8996:2021 Ergonomics of the thermal environment – Determination of metabolic rate

Workplace Heat Stress Risk Assessment Form (Template)

(Please put a "✓" in the appropriate box.)

Name of organization/ department: _____

Location of work: _____

Description of work: _____

Number of employees involved: _____

Part A: Assessment Section:

Assessment items	Yes	No	Available control measures
Environmental factors			
1. Do the employees need to work in hot weather or high-temperature environments?	☐	☐	☐ Employees performing light to moderate levels of physical work should be given at least a 10-minute rest break after every 2 hours of work; employees performing heavy to very heavy levels of physical work should be given at least a 15-minute rest break after every 2 hours of work (except for those who have been provided with additional rest time as recommended in Part B of this form, if a Heat Stress at Work Warning is in effect); ☐ Reschedule outdoor and/or high physically demanding work to cooler periods and/or cooler locations; ☐ Arrange for employees to work alternately in hotter and cooler environments; ☐ Others: _____
2. Do the employees need to work outdoor and under direct sunlight?	☐	☐	☐ Set up shelters or sun-blocking covers (such as sunshade / parasol) over the work positions; ☐ Provide employees with sun protection equipment, such as wide-brimmed hats / safety helmets with neck shades and sun protection sleeves; ☐ Others: _____
3. Are there any heat sources / heat-generating facilities near the working location?	☐	☐	☐ Set up suitable shield or isolate the heat-generating facilities at the working location; ☐ Provide employees with personal protective equipment for heat protection and insulation (such as radiant heat protection hood); ☐ Others: _____
4. Is there no effective ventilation equipment in the working location with poor natural ventilation?	☐	☐	☐ Use effective ventilation system to increase air flow; ☐ Use effective exhaust ventilation to remove hot or humid air from the work location; ☐ Others: _____
5. Does employees' working location/ work situation require increased air flow or other methods to enhance heat dissipation?	☐	☐	☐ Provide employees with blowers, misting fans or portable fans to enhance heat dissipation; ☐ Provide cooling vests that contain frozen packs or refrigerating devices; ☐ Others: _____

Work factors			
6. Is the workload of the employees physically demanding?	☐	☐	☐ Provide mechanical aids or measures such as team lifting to minimize employees' physical exertion and workload; ☐ Others: _____
7. Do the employees perform heavy physical work for long periods or at a rapid pace?	☐	☐	☐ Optimize work schedules or arrange job rotations to reduce the workload and work pace for employees; ☐ Others: _____
8. Do the employees wear non-breathable clothing?	☐	☐	☐ Wear thin and breathable clothing; ☐ Schedule tasks requiring the wearing of non-breathable clothing to cooler periods of the day; ☐ Provide employees who wear non-breathable protective clothing with cooling vests that contain frozen packs or refrigerating devices to reduce their heat stress; ☐ Others: _____
Personal factors			
9. Do employees face any of the above heat stress risk factors arising from the environment or work?	☐	☐	☐ Provide employees with information, instruction, training, and supervision on heat-related illnesses; ☐ Provide employees with sufficient drinking water and arrange for them to have access to it within 10 minutes of walking; ☐ Others: _____
10. Are any employees yet to acclimatize/ re-acclimatize to work in hot weather or high-temperature environments?	☐	☐	☐ Arrange suitable work schedules for relevant employees for heat acclimatization; ☐ Arrange extra resting time for relevant employees; ☐ Others: _____
Others			
Risk factors: _____ _____ _____			Control measures: _____ _____ _____

Part B: Assess the hourly rest time required for employees in times of Heat Stress at Work Warnings:

Employers should refer to the work and rest schedules in **Appendix 4** and record the various factors that can increase or decrease the recommended rest time per hour based on the results in Part A, and then calculate the adjustment of the recommended hourly rest time when Heat Stress at Work Warnings in effect.

Conditions for reducing rest time	**Adjustment of hourly rest time**
☐ Work in indoor environment or set up shading facilities (such as shelter or sun-blocking cover)	☐ -15 mins
☐ Provided devices to facilitate heat dissipation (blowers/ misting fans/ portable fan/ cooling vest containing frozen packs or refrigerating devices)	☐ -15 mins
Conditions for increasing rest time	
☐ Existing heat source/ heat-generating facilities at working location without effective heat shielding or exhaust ventilation for hot air/moisture	☐ +15 mins
☐ Poor natural ventilation at the workplace and without effective ventilation equipment	☐ +15 mins
☐ Need to wear non-breathable protective clothing	☐ +15 mins
Adjustment of rest time	**Increase/Decrease* _____ min**

* Please delete if inappropriate

Rest time corresponding to the physical workload of employees under different Heat Stress at Work Warnings			
Employee position: _____			
Job nature: _____			
Physical workload categories **(Appendix 1)**	Warning levels	Hourly rest time **before adjustment (Appendix 4)**	Hourly rest time **after adjustment****
☐ Very heavy ☐ Heavy ☐ Moderate ☐ Light	**Amber Heat Stress at Work Warning**	_____ min	_____ min
	Red Heat Stress at Work Warning	_____ min	_____ min
	Black Heat Stress at Work Warning	_____ min	_____ min
Are the employees **unacclimatized / required to re-acclimatize** to work in hot environments?		☐ Yes: **Additional 15-minute rest time per hour** to be given to relevant employees (based on the adjusted hourly rest time above)	
		☐ No	

** If the adjusted hourly rest time is zero or negative, the employer should still arrange for the employees to rest for 10 to 15 minutes every two hours of work in accordance with paragraph 4.7.1.

Part C: Follow-up Items:

Follow-up actions of possible control measures that identified in the risk assessment but not yet implemented/completed are as follows:

Assessment item / Number	Corresponding control measures	Expected date of completion

Note: If the implementation of above corresponding control measures changes the adjusted rest time for employees, their employer should update this risk assessment form.

Part D: Emergency Response Plan:

Employers /responsible persons should take the following emergency response measures to ensure that employees working in hot environments receive timely support and/or assistance:

Emergency response measures	Remarks

Part E: Assessment Record-keeping:

Employers should keep a record of this assessment, explain the assessment results to employees and provide appropriate instructions to ensure that employees take appropriate rest breaks per hour according to the assessment results when the Heat Stress at Work Warning is in effect and minimize heat stress at work.

Assessor's signature: _____

Assessor's name: _____

Assessor's position: _____

Assessment date: _____

Workplace Heat Stress Risk Assessment Form (example 1)

(Please put a "✓" in the appropriate box.)

Name of organization/ department: XXX Cleaning Company Limited

Location of work: Street of Central and Western District

Description of work: Street cleaning (street sweeping and picking up litter)

Number of employees involved: 20

Part A: Assessment Section:

Assessment items	Yes	No	Available control measures
Environmental factors			
1. Do the employees need to work in hot weather or high-temperature environments?	☑	☐	☑ Employees performing light to moderate levels of physical work should be given at least a 10-minute rest break after every 2 hours of work; employees performing heavy to very heavy levels of physical work should be given at least a 15-minute rest break after every 2 hours of work (except for those who have been provided with additional rest time as recommended in Part B of this form, if a Heat Stress at Work Warning is in effect); ☐ Reschedule outdoor and/or high physically demanding work to cooler periods and/or cooler locations; ☐ Arrange for employees to work alternately in hotter and cooler environments; ☐ Others: _____
2. Do the employees need to work outdoor and under direct sunlight?	☑	☐	☐ Set up shelters or sun-blocking covers (such as sunshade / parasol) over the work positions; ☑ Provide employees with sun protection equipment, such as wide-brimmed hats / safety helmets with neck shades and sun protection sleeves; ☐ Others: _____
3. Are there any heat sources / heat-generating facilities near the working location?	☐	☑	☐ Set up suitable shield or isolate the heat-generating facilities at the working location; ☐ Provide employees with personal protective equipment for heat protection and insulation (such as radiant heat protection hood); ☐ Others: _____
4. Is there no effective ventilation equipment in the working location with poor natural ventilation?	☐	☑	☐ Use effective ventilation system to increase air flow; ☐ Use effective exhaust ventilation to remove hot or humid air from the work location; ☐ Others: _____
5. Does employees' working location/ work situation require increased air flow or other methods to enhance heat dissipation?	☑	☐	☑ Provide employees with blowers, misting fans or portable fans to enhance heat dissipation; ☐ Provide cooling vests that contain frozen packs or refrigerating devices; ☐ Others: _____

Work factors			
6. Is the workload of the employees physically demanding?	☑	☐	☐ Provide mechanical aids or measures such as team lifting to minimize employees' physical exertion and workload; ☑ Others: Provide hand truck to reduce physical exertion required.
7. Do the employees perform heavy physical work for long periods or at a rapid pace?	☐	☑	☐ Optimize work schedules or arrange job rotations to reduce the workload and work pace for employees; ☐ Others: _____
8. Do the employees wear non-breathable clothing?	☐	☑	☑ Wear thin and breathable clothing; ☐ Schedule tasks requiring the wearing of non-breathable clothing to cooler periods of the day; ☐ Provide employees who wear non-breathable protective clothing with cooling vests that contain frozen packs or refrigerating devices to reduce their heat stress; ☐ Others: _____
Personal factors			
9. Do employees face any of the above heat stress risk factors arising from the environment or work?	☑	☐	☑ Provide employees with information, instruction, training, and supervision on heat-related illnesses; ☐ Provide employees with sufficient drinking water and arrange for them to have access to it within 10 minutes of walking; ☑ Others: Instruct employees to fill up water bottles inside the station before work commences and seek assistance from the supervisor if needed.
10. Are any employees yet to acclimatize/ re-acclimatize to work in hot weather or high-temperature environments?	☐	☑	☐ Arrange suitable work schedules for relevant employees for heat acclimatization; ☐ Arrange extra resting time for relevant employees; ☐ Others: _____

Others	
Risk factors:	Control measures:
_____	_____
_____	_____
_____	_____

Part B: Assess the hourly rest time required for employees in times of Heat Stress at Work Warnings:

Employers should refer to the work and rest schedules in **Appendix 4** and record the various factors that can increase or decrease the recommended rest time per hour based on the results in Part A, and then calculate the adjustment of the recommended hourly rest time when Heat Stress at Work Warnings in effect.

Conditions for reducing rest time	Adjustment of hourly rest time
☐ Work in indoor environment or set up shading facilities (such as shelter or sun-blocking cover)	☐ -15 mins
☑ Provided devices to facilitate heat dissipation (blowers/ misting fans/ portable fan/ cooling vest containing frozen packs or refrigerating devices)	☑ -15 mins
Conditions for increasing rest time	
☐ Existing heat source/ heat-generating facilities at working location without effective heat shielding or exhaust ventilation for hot air/moisture	☐ +15 mins
☐ Poor natural ventilation at the workplace and without effective ventilation equipment	☐ +15 mins
☐ Need to wear non-breathable protective clothing	☐ +15 mins
Adjustment of rest time	~~**Increase**~~**/Decrease*** 15 **min**

* Please delete if inappropriate

Rest time corresponding to the physical workload of employees under different Heat Stress at Work Warnings

Employee position: Cleaning Worker

Job nature: Street cleaning (street sweeping and picking up litter)

Physical workload categories **(Appendix 1)**	Warning levels	Hourly rest time **before adjustment (Appendix 4)**	Hourly rest time **after adjustment****
☐ Very heavy ☐ Heavy ☑ Moderate ☐ Light	**Amber Heat Stress at Work Warning**	15 min	0 min
	Red Heat Stress at Work Warning	30 min	15 min
	Black Heat Stress at Work Warning	45 min	30 min
Are the employees **unacclimatized / required to re-acclimatize** to work in hot environments?		☐ Yes: **Additional 15-minute rest time per hour** to be given to relevant employees (based on the adjusted hourly rest time above)	
		☑ No	

** If the adjusted hourly rest time is zero or negative, the employer should still arrange for the employees to rest for 10 to 15 minutes every two hours of work in accordance with paragraph 4.7.1.

Part C: Follow-up Items:

Follow-up actions of possible control measures that identified in the risk assessment but not yet implemented/completed are as follows:

Assessment item / Number	Corresponding control measures	Expected date of completion
9	- Provide employees with information, instruction, training, and supervision on heat-related illnesses - Instruct employees to fill up water bottles inside the station before work commences and seek assistance from the supervisor if needed	2023/04/02
5	- Provide employees with portable fans	Implemented
2	- Provide employees with sun protection equipment	Implemented
6	- Provide hand truck	Implemented

Note: If the implementation of above corresponding control measures changes the adjusted rest time for employees, their employer should update this risk assessment form.

Part D: Emergency Response Plan:

Employers /responsible persons should take the following emergency response measures to ensure that employees working in hot environments receive timely support and/or assistance:

Emergency response measures	Remarks
An employee is experiencing dizziness or similar symptoms	Contact ambulance depot
Employees express the need for more drinking water in hot weather	Deliver water to the working location

Part E: Assessment Record-keeping:

Employers should keep a record of this assessment, explain the assessment results to employees and provide appropriate instructions to ensure that employees take appropriate rest breaks per hour according to the assessment results when the Heat Stress at Work Warning is in effect and minimize heat stress at work.

Assessor's signature: XXX

Assessor's name: CHAN Tai-man

Assessor's position: Project Manager

Assessment date: 1 April, 2023

Workplace Heat Stress Risk Assessment Form (example 2)

(Please put a "✓" in the appropriate box.)

Name of organization/ department: XXX Cleaning Company Limited

Location of work: AA Court (Block 1 to 12, 30 floors each)

Description of work: Using a 660L bin to collect and transport garbage twice a day (am & pm)

Number of employees involved: 12

Part A: Assessment Section:

Assessment items	Yes	No	Available control measures
Environmental factors			
1. Do the employees need to work in hot weather or high-temperature environments?	☑	☐	☑ Employees performing light to moderate levels of physical work should be given at least a 10-minute rest break after every 2 hours of work; employees performing heavy to very heavy levels of physical work should be given at least a 15-minute rest break after every 2 hours of work (except for those who have been provided with additional rest time as recommended in Part B of this form, if a Heat Stress at Work Warning is in effect); ☑ Reschedule outdoor and/or high physically demanding work to cooler periods and/or cooler locations; ☐ Arrange for employees to work alternately in hotter and cooler environments; ☐ Others: _____
2. Do the employees need to work outdoor and under direct sunlight?	☐	☑	☐ Set up shelters or sun-blocking covers (such as sunshade / parasol) over the work positions; ☐ Provide employees with sun protection equipment, such as wide-brimmed hats / safety helmets with neck shades and sun protection sleeves; ☐ Others: _____
3. Are there any heat sources / heat-generating facilities near the working location?	☐	☑	☐ Set up suitable shield or isolate the heat-generating facilities at the working location; ☐ Provide employees with personal protective equipment for heat protection and insulation (such as radiant heat protection hood); ☐ Others: _____
4. Is there no effective ventilation equipment in the working location with poor natural ventilation?	☑	☐	☐ Use effective ventilation system to increase air flow; ☐ Use effective exhaust ventilation to remove hot or humid air from the work location; ☐ Others: _____
5. Does employees' working location/ work situation require increased air flow or other methods to enhance heat dissipation?	☑	☐	☑ Provide employees with blowers, misting fans or portable fans to enhance heat dissipation; ☐ Provide cooling vests that contain frozen packs or refrigerating devices; ☐ Others: _____

Work factors			
6. Is the workload of the employees physically demanding?	☑	☐	☐ Provide mechanical aids or measures such as team lifting to minimize employees' physical exertion and workload; ☑ Others: Regular inspections and maintenance of the 660L bins to ensure the smooth operation of the wheels.
7. Do the employees perform heavy physical work for long periods or at a rapid pace?	☐	☑	☐ Optimize work schedules or arrange job rotations to reduce the workload and work pace for employees; ☐ Others: _____
8. Do the employees wear non-breathable clothing?	☐	☑	☐ Wear thin and breathable clothing; ☐ Schedule tasks requiring the wearing of non-breathable clothing to cooler periods of the day; ☐ Provide employees who wear non-breathable protective clothing with cooling vests that contain frozen packs or refrigerating devices to reduce their heat stress; ☐ Others: _____
Personal factors			
9. Do employees face any of the above heat stress risk factors arising from the environment or work?	☑	☐	☑ Provide employees with information, instruction, training, and supervision on heat-related illnesses; ☑ Provide employees with sufficient drinking water and arrange for them to have access to it within 10 minutes of walking; ☐ Others: _____
10. Are any employees yet to acclimatize/ re-acclimatize to work in hot weather or high-temperature environments?	☐	☑	☐ Arrange suitable work schedules for relevant employees for heat acclimatization; ☐ Arrange extra resting time for relevant employees; ☐ Others: _____
Others			
Risk factors:			Control measures:

Part B: Assess the hourly rest time required for employees in times of Heat Stress at Work Warnings:

Employers should refer to the work and rest schedules in **Appendix 4** and record the various factors that can increase or decrease the recommended rest time per hour based on the results in Part A, and then calculate the adjustment of the recommended hourly rest time when Heat Stress at Work Warnings in effect.

Conditions for reducing rest time	Adjustment of hourly rest time
☑ Work in indoor environment or set up shading facilities (such as shelter or sun-blocking cover)	☑ -15 mins
☑ Provided devices to facilitate heat dissipation (blowers/ misting fans/ portable fan/ cooling vest containing frozen packs or refrigerating devices)	☑ -15 mins
Conditions for increasing rest time	
☐ Existing heat source/ heat-generating facilities at working location without effective heat shielding or exhaust ventilation for hot air/moisture	☐ +15 mins
☑ Poor natural ventilation at the workplace and without effective ventilation equipment	☑ +15 mins
☐ Need to wear non-breathable protective clothing	☐ +15 mins
Adjustment of rest time	~~**Increase**~~**/Decrease*** 15 **min**

* Please delete if inappropriate

Rest time corresponding to the physical workload of employees under different Heat Stress at Work Warnings			
Employee position: Cleaning Worker			
Job nature: Collection of garbage in the estate			
Physical workload categories **(Appendix 1)**	Warning levels	Hourly rest time **before adjustment (Appendix 4)**	Hourly rest time **after adjustment****
☐ Very heavy ☐ Heavy ☑ Moderate ☐ Light	**Amber Heat Stress at Work Warning**	15 min	0 min
	Red Heat Stress at Work Warning	30 min	15 min
	Black Heat Stress at Work Warning	45 min	30 min
Are the employees **unacclimatized / required to re-acclimatize** to work in hot environments?		☐ Yes: **Additional 15-minute rest time per hour** to be given to relevant employees (based on the adjusted hourly rest time above)	
		☑ No	

** If the adjusted hourly rest time is zero or negative, the employer should still arrange for the employees to rest for 10 to 15 minutes every two hours of work in accordance with paragraph 4.7.1.

Part C: Follow-up Items:

Follow-up actions of possible control measures that identified in the risk assessment but not yet implemented/completed are as follows:

Assessment item / Number	Corresponding control measures	Expected date of completion
5	- Provide employees with portable fans	2023/05/01
9	- Provide employees with information, instruction, training, and supervision on heat-related illnesses - Provide employees with sufficient drinking water, which is accessible within walking distance of no more than 10 minutes	2023/04/15
6	- Regular inspections and maintenance of the 660L bin to ensure the smooth operation of the wheels	2023/04/15

Note: If the implementation of above corresponding control measures changes the adjusted rest time for employees, their employer should update this risk assessment form.

Part D: Emergency Response Plan:

Employers /responsible persons should take the following emergency response measures to ensure that employees working in hot environments receive timely support and/or assistance:

Emergency response measures	Remarks
An employee is experiencing dizziness or similar symptoms	Contact ambulance depot

Part E: Assessment Record-keeping:

Employers should keep a record of this assessment, explain the assessment results to employees and provide appropriate instructions to ensure that employees take appropriate rest breaks per hour according to the assessment results when the Heat Stress at Work Warning is in effect and minimize heat stress at work.

Assessor's signature: XXX

Assessor's name: CHAN Tai-man

Assessor's position: Project Manager

Assessment date: 1 April, 2023

Workplace Heat Stress Risk Assessment Form (example 3)

(Please put a "✓" in the appropriate box.)

Name of organization/ department: ABC Construction Company Limited

Location of work: Public housing development construction site at Lot 1104

Description of work: Rebar fixing of bar bender at roof slab

Number of employees involved: 20

Part A: Assessment Section:

Assessment items	Yes	No	Available control measures
Environmental factors			
1. Do the employees need to work in hot weather or high-temperature environments?	☑	☐	☑ Employees performing light to moderate levels of physical work should be given at least a 10-minute rest break after every 2 hours of work; employees performing heavy to very heavy levels of physical work should be given at least a 15-minute rest break after every 2 hours of work (except for those who have been provided with additional rest time as recommended in Part B of this form, if a Heat Stress at Work Warning is in effect); ☐ Reschedule outdoor and/or high physically demanding work to cooler periods and/or cooler locations; ☐ Arrange for employees to work alternately in hotter and cooler environments; ☐ Others: _____
2. Do the employees need to work outdoor and under direct sunlight?	☑	☐	☑ Set up shelters or sun-blocking covers (such as sunshade / parasol) over the work positions; ☑ Provide employees with sun protection equipment, such as wide-brimmed hats / safety helmets with neck shades and sun protection sleeves; ☐ Others: _____
3. Are there any heat sources / heat-generating facilities near the working location?	☐	☑	☐ Set up suitable shield or isolate the heat-generating facilities at the working location; ☐ Provide employees with personal protective equipment for heat protection and insulation (such as radiant heat protection hood); ☐ Others: _____
4. Is there no effective ventilation equipment in the working location with poor natural ventilation?	☐	☑	☐ Use effective ventilation system to increase air flow; ☐ Use effective exhaust ventilation to remove hot or humid air from the work location; ☐ Others: _____
5. Does employees' working location/ work situation require increased air flow or other methods to enhance heat dissipation?	☑	☐	☑ Provide employees with blowers, misting fans or portable fans to enhance heat dissipation; ☐ Provide cooling vests that contain frozen packs or refrigerating devices; ☐ Others: _____

Work factors			
6. Is the workload of the employees physically demanding?	☑	☐	☐ Provide mechanical aids or measures such as team lifting to minimize employees' physical exertion and workload; ☐ Others: _____
7. Do the employees perform heavy physical work for long periods or at a rapid pace?	☑	☐	☑ Optimize work schedules or arrange job rotations to reduce the workload and work pace for employees; ☐ Others: _____
8. Do the employees wear non-breathable clothing?	☐	☑	☑ Wear thin and breathable clothing; ☐ Schedule tasks requiring the wearing of non-breathable clothing to cooler periods of the day; ☐ Provide employees who wear non-breathable protective clothing with cooling vests that contain frozen packs or refrigerating devices to reduce their heat stress; ☐ Others: _____
Personal factors			
9. Do employees face any of the above heat stress risk factors arising from the environment or work?	☑	☐	☑ Provide employees with information, instruction, training, and supervision on heat-related illnesses; ☑ Provide employees with sufficient drinking water and arrange for them to have access to it within 10 minutes of walking; ☐ Others: _____
10. Are any employees yet to acclimatize/ re-acclimatize to work in hot weather or high-temperature environments?	☑	☐	☑ Arrange suitable work schedules for relevant employees for heat acclimatization; ☑ Arrange extra resting time for relevant employees; ☐ Others: _____

Others	
Risk factors:	Control measures:
_____	_____
_____	_____
_____	_____

Part B: Assess the hourly rest time required for employees in times of Heat Stress at Work Warnings:

Employers should refer to the work and rest schedules in **Appendix 4** and record the various factors that can increase or decrease the recommended rest time per hour based on the results in Part A, and then calculate the adjustment of the recommended hourly rest time when Heat Stress at Work Warnings in effect.

Conditions for reducing rest time	Adjustment of hourly rest time
☑ Work in indoor environment or set up shading facilities (such as shelter or sun-blocking cover)	☑ -15 mins
☑ Provided devices to facilitate heat dissipation (blowers/ misting fans/ portable fan/ cooling vest containing frozen packs or refrigerating devices)	☑ -15 mins
Conditions for increasing rest time	
☐ Existing heat source/ heat-generating facilities at working location without effective heat shielding or exhaust ventilation for hot air/moisture	☐ +15 mins
☐ Poor natural ventilation at the workplace and without effective ventilation equipment	☐ +15 mins
☐ Need to wear non-breathable protective clothing	☐ +15 mins
Adjustment of rest time	~~**Increase**~~**/Decrease*** 30 **min**

* Please delete if inappropriate

Rest time corresponding to the physical workload of employees under different Heat Stress at Work Warnings

Employee position: Bar Bender

Job nature: Rebar Fixing at roof slab

Physical workload categories **(Appendix 1)**	Warning levels	Hourly rest time **before adjustment (Appendix 4)**	Hourly rest time **after adjustment****
☑ Very heavy ☐ Heavy ☐ Moderate ☐ Light	**Amber Heat Stress at Work Warning**	45 min	15 min
	Red Heat Stress at Work Warning	60 min	30 min
	Black Heat Stress at Work Warning	60+15# min	45 min
Are the employees **unacclimatized / required to re-acclimatize** to work in hot environments?		☑ Yes: **Additional 15-minute rest time per hour** to be given to relevant employees (based on the adjusted hourly rest time above)	
		☐ No	

** If the adjusted hourly rest time is zero or negative, the employer should still arrange for the employees to rest for 10 to 15 minutes every two hours of work in accordance with paragraph 4.7.1.

The 15 mins rest break adjustment considers the difference of work between a very heavy and heavy workload in times of the Black Heat Stress at Work Warning.

Part C: Follow-up Items:

Follow-up actions of possible control measures that identified in the risk assessment but not yet implemented/completed are as follows:

Assessment item / Number	Corresponding control measures	Expected date of completion
2	- Set up shelters / sun-blocking covers over the work positions and provide employees with sun protection equipment	2023/04/10
9	- Provide employees with information, instruction, training, and supervision on heat-related illnesses - Provide employees with potable water in roof slap for easy replenishment of water	Immediate
5	- Provide employees with portable fans	Implemented
10	- Arrange work schedules for relevant employees for heat acclimatization	Immediate
7	- Rotate work among different employees	Implemented

Note: If the implementation of above corresponding control measures changes the adjusted rest time for employees, their employer should update this risk assessment form.

Part D: Emergency Response Plan:

Employers /responsible persons should take the following emergency response measures to ensure that employees working in hot environments receive timely support and/or assistance:

Emergency response measures	Remarks
An employee is experiencing dizziness or similar symptoms	Contact ambulance depot

Part E: Assessment Record-keeping:

Employers should keep a record of this assessment, explain the assessment results to employees and provide appropriate instructions to ensure that employees take appropriate rest breaks per hour according to the assessment results when the Heat Stress at Work Warning is in effect and minimize heat stress at work.

Assessor's signature: XXX

Assessor's name: CHAN Tai-man

Assessor's position: Safety Officer

Assessment date: 1 April, 2023

Appendix 4

Rest Arrangements for Outdoor Work in Times of Heat Stress at Work Warning

Heat Stress at Work Warning \ Physical Workload	Light	Moderate	Heavy	Very Heavy
		45 mins work 15 mins rest in each hour (75% work; 25% rest)	30 mins work 30 mins rest in each hour (50% work; 50% rest)	15 mins work 45 mins rest in each hour (25% work; 75% rest)
	45 mins work 15 mins rest in each hour (75% work; 25% rest)	30 mins work 30 mins rest in each hour (50% work; 50% rest)	15 mins work 45 mins rest in each hour (25% work; 75% rest)	Suspension of work
	30 mins work 30 mins rest in each hour (50% work; 50% rest)	15 mins work 45 mins rest in each hour (25% work; 75% rest)	Suspension of work	Suspension of work

Note:

1. The above rest arrangements assume that the employees are working outdoors without any preventive measures.
2. If the employer has conducted a risk assessment for employees in advance and has adopted suitable preventive measures, the above arrangements can be adjusted accordingly.

Appendix 5

Guidelines on Notification of Accidents

Work injury

Heat stroke is the health damage that occurs when the body's physiological temperature control mechanism is overwhelmed under hot weather or in a hot environment. Therefore, if an employee suffered from heat stroke while working in a hot environment, it will be considered and handled as work injury.

The Employees' Compensation Ordinance (ECO) stipulates that if an employee sustains an injury or dies as a result of an accident arising out of and in the course of his employment, under normal circumstances, the employer is liable to pay compensation under ECO.

Responsibility of an Employee

An employee should notify the employer when he sustains a work injury as soon as possible. Failure to give prompt notice may jeopardise and delay his claim for employees' compensation. Notice may be given orally or in writing to the employer or to the employee's supervisor. The employer is presumed to have had noticed of an accident if the employee dies on the employer's premises.

Responsibility of an Employer

According to section 15 of ECO, if any accident results in the injury or death of an employee, the employer must notify the Commissioner for Labour within the following time limits after the accident, irrespective of whether the accident gives rise to any liability to pay compensation:

	Resulting in	Notify Period	Form
Work Injury	Incapacity for a period not exceeding 3 days	Within 14 days	Form 2B
	Incapacity for a period exceeding 3 days	Within 14 days	Form 2
	Death	Within 7 days	

If the employer is not aware of the happening of the accident within the respective periods, he must notify the Commissioner for Labour within 7 or 14 days, as the case may be, after the accident came to his knowledge.

If you have queries about ECO, please call 2717 1771 (the hotline is handled by the "1823").

Other publications related to employee's compensation have been uploaded to the Labour Department website (https://www.labour.gov.hk/eng/public/content2_7.htm).

Appendix 6

Heat Stress at Work Warning Messages (Template)

(Issue or update)

A reminder from the Labour Department: Amber/ Red/ Black Heat Stress at Work Warning is in effect today at [hh:mm] am/pm, indicating that the heat stress in some work environments is high/ very high/ extremely high. Please take appropriate heat preventive measures.

(This message was issued at [hh:mm] on [DD/MM/YYYY])

(Cancellation)

A reminder from the Labour Department: The Heat Stress at Work Warning has been cancelled today at [hh:mm] am/pm.

(This message was issued at [hh:mm] on [DD/MM/YYYY])

Enquiries and Complaints

Enquiries

If you wish to enquire about this Guidance Notes or require advice on occupational safety and health matters, please contact the Occupational Safety and Health Branch of the Labour Department through:

Telephone : 2852 4041 or 2559 2297 (auto-recording service available outside service hours.)

Fax : 2581 2049

Email : enquiry@labour.gov.hk

Information on the services offered by the Labour Department and on major labour legislation is also available on our website at www.labour.gov.hk.

For details on the services offered by the Occupational Safety and Health Council, please call 2739 9000.

Labour Department Website

Complaints

If you have any complaints about unsafe operations or environments at workplaces, please call the Labour Department's Occupational Safety and Health (OSH) complaint hotline at 2542 2172 or fill out and submit an online OSH complaint form on our website. All complaints will be treated in the strictest confidence.

Online OSH Complaint Form

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