



Health & Safety Department (Safety Section)		
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## **Document History Log**

Any modification to the document must be reviewed and approved as per the corporate policies and procedures of document control

Version #	Date	Prepared/reviewed by	Modifications summary
V 3.0	09/05/2024	Safety Section	Adding the new logo of both Dubai Government & Dubai Municipality

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## **1** Purpose

#### Introduction:

The Emirate of Dubai is geographically located in the Middle East region and has hot weather conditions during the summer season. The most vulnerable group to this condition is the manufacturing, service industries and the construction sector, yet these activities cannot be stopped due to the economic and social considerations. There are certain measures that can be taken to prevent any unwanted heat related illnesses and accidents resulting at work while performing work in such conditions.

Federal Law No.8 (UAE Labor Code), Ministerial Order No. 32 of 1982 and Dubai Municipality Local Order 61 of 1991 clearly emphasizes the role of employers to take every necessary precaution for the protection of their workers and ensure their safety from any occupational illnesses or potential work accidents. The employer shall also develop appropriate control measures to improve work conditions for their workers and thereby provide them with a healthy work environment.

The purpose of this technical guideline is to provide guidance in protecting the health of the worker while working in hot environments. This document entails the factors to be considered during risk assessment, controls to minimize risk of heat stress, training requirements, emergency preparedness and monitoring the effectiveness of the control measures for further improvements.

Employers having their work activities which can result in heat illnesses shall conduct heat stress risk assessment based on the above approach and make all reasonably practical efforts in developing and implementing appropriate controls, as suggested further in these guidelines.

The role of supervisor or foreman or person who oversees the task team (being the front-line supervisors) is critical in preventing heat stress impact on the workers' health during the hot environment.

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# 2 Scope

This technical guideline shall apply to all commercial and industrial establishments, public or government institutions, including construction-related project sites in the emirate of Dubai.

# **3** Definitions

Unless the context otherwise requires, the following terms shall be deemed to mean the definitions hereby assigned to them.

Definition	Meaning	
	Heat Stroke occurs when a person's body temperature	
	regulation system fails, and the body temperature rises to	
	critical levels.	
Heat Stroke	The symptoms of heat stroke are confusion, irrational	
Heat Stroke	behavior, loss of consciousness, convulsions, hot dry skin,	
	and high body temperature (41°C/105.8°F). If the body	
	temperature is high, it can result in death if left untreated.	
	Heat stroke is a medical emergency and needs immediate	
	treatment by a medical professional.	
	Heat Exhaustion is caused by loss of body water and salt	
Heat Exhaustion	through excessive sweating.	
	The symptoms of heat exhaustion are heavy sweating and	
	a high pulse rate. This is a preliminary stage for a heat	
	stroke.	

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حکومــــة دبـــــي GOVERNMENT OF DUBAI Health & Safety Department
Technical Guidelines for Management of Heat
Stress at Work

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الوحدة التنظيمية:

بالدية دبي Dubai Municipality

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Definition	Meaning			
Heat Cramp	Muscle spasms or involuntary jerks due to salt imbalance resulting in replacing salt lost with sweat. This is a preliminary stage leading to Heat exhaustion. The symptoms of heat cramps are muscle pain and muscle			
	cramps.			
Heat Stress	Heat stress is when the heat regulating mechanism of the body fails, resulting in increased body temperature above 37°C and affecting the individual's physiological processes, resulting in strain on the body.			
Heat Rashes	Prickly heat is a condition where the skin that is persistently wetted by unevaporated sweat leads to formation of red papules. These papules may become infected if left untreated and disappears after returning to a cool environment.			
Acclimatization	Acclimatization or acclimation is the process wherein the individual body organs adjust to a gradual change in its environment (for example, change in humidity or temperature) enabling it to maintain performance across a range of environmental conditions. Minimum duration for an individual to get acclimatized with the changed environmental conditions is around 7-8 days but full acclimatization may last up to 14 days or more depending on different factors related to the person, such as increased risk of heat illness due to certain medical conditions or medical treatment or the environment.			

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## 4 Main Title

## 5 Factors to be considered during Hazard Identification and Risk Assessment

Working in hot environments can result in heat related illnesses and may result in serious injuries to workers. To prevent such illnesses, injuries and incidents at workplace, employers whose work activities are in hot environments whether indoor or outdoor, shall conduct a hazard identification and risk assessment prior to starting the work. Following risk factors shall be considered while conducting the risk assessment:

- i. Environment factors:
  - Ambient air temperature, air movement and relative humidity can all affect an individual's response to hot environments.
- ii. Job factors:
  - Workload performing tasks in hot environment by the individual worker
  - Types of work heavy work (more strenuous work) in hot weather, dealing with hazardous substances, working at heights or in confined spaces and any other such work, which can aggravate the risk while performing the work in hot conditions.
  - Use of personal protective equipment. Non-breathable garments block the evaporation and can aggravate the heat stress in the worker.
- iii. Personnel factors:
  - Obesity, poor physical conditions/not physically fit, health problems, previous illnesses, heart disease /high blood pressure and medications, alcohol consumption, lack or insufficient rest, food intake, age factors and lack of acclimatization.

## 6 Heat Index, Risk Level and Control Approach

Heat stress risk level can be assessed quickly from the following table and accordingly control strategies shall be adopted at the workplace by the employer:

Heat Index	Risk Level	Control Approach	
Up to 34 °C	+ °C Low risk (caution) Basic heat safety and planning		
35 to 39 °C	Moderate	Implement planned controls and create awareness	
40 to 45 °C	High	Additional controls as planned with more awareness	
46 °C and above	Very high	Enhanced controls as planned with enhanced awareness control	

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#### Heat Index

The heat index (HI) is an index that combines air temperature and relative humidity to determine the equivalent human-perceived temperature.

The higher the heat index hotter the weather feels, since sweat readily does not evaporate and cools the skin. The heat index is the better measure than the air temperature alone for estimating the risk to workers from environmental heat sources (For heat index chart, refer to Annex A).

Employers shall ensure that they have sufficient instruments such as dry and wet bulb globe thermometers or are using properly calibrated instruments to measure temperature and relative humidity. Precautions shall be taken while placing these instruments on a surface which shall not affect the actual readings due to the local surface temperature or environment.

## 7 Controls to reduce effects of heat stress on workers while working in hot environment

Below proposed controls shall be adapted (as practicable) at the workplace to reduce heat stress illnesses and injuries at work:

#### Acclimatization

Individuals who are not given enough time to adjust to the hot environments are more likely to experience heat related disorders. Therefore, it is advisable to give an individual sufficient time to get acclimatized to higher environmental temperatures to gradually get exposed to heat conditions.

Acclimatization is mostly required for individuals who are working first time in a hot environment or have joined work in such hot environments after a long gap (which may be due to an illness or been on long vacation) or have been working earlier in cold environment for a long time and now are scheduled for working in hot environment. Accordingly, it is recommended that employers should prepare a plan for such workers to get acclimatized before putting them on a task in a hot environment.

#### Work and rest scheduling

To prevent working in hot weather for extended periods, workers should be permitted to distribute the workload evenly over the day and incorporate work and rest cycles wherever possible.

Work or rest cycles give the person's body an opportunity to get rid of excess heat, slow down the generation of internal body heat, heart rate and provide better blood circulation to the skin.

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For evaluating an appropriate work/rest schedule, following criteria shall be considered:

Rest period can be increased, and work period can be decreased based on one or all the below mentioned condition:

- As the temperature rises
- As the humidity increases
- When there is no air movement
- When protective equipment is worn, this may aggravate the body heat.
- When performing heavier or strenuous work
- When working under the direct sun.

Accordingly, the Ministry of Human Resources and Emiratization has issued regulations restricting the working hours schedule during summer in UAE.

All employees shall adhere to this regulation in addition to the other required controls measures as needed to perform the work based on their risk assessment.

The waver of this regulation is exclusively controlled by the Ministry of Human Resources and Emiratization. Worker should spend the rest periods of the cycle in a cool place such as in lightly air-conditioned room/place or in well-ventilated full shed /shelter to maintain the core body temperature within the acceptable limits that is, less than or equal to 38.5 °C for acclimatized and less than or equal to 38 °C for acclimatized workers.

#### Shelter/Shade

Shade is one of the most primary heat stress controls for hot climates. Radiant heat load can be reduced to a minimum 10 °C, when working in shades than under direct sunlight.

Also, the shaded break area shall be kept cooler than the normal work area to facilitate quicker recovery from the effects of heat. As mentioned above, a 10-15 °C difference in temperature needs to be maintained between the work area and the break area.

#### Provision for cool drinking water and salt replenishment drink at hot work locations

Due to excessive sweating, substantial loss of water and salt from the body leads to dehydration and heat illnesses in the individuals while working in hot weather. Considering this, the employer shall ensure that sufficient cool drinking water for the workers while working in hot weather is made available closer to their workplace. Workers should drink sufficient drinking water (so that they don't feel thirsty) and salt replenishment drink/ electrolyte (sequence recommended is a glass of water every hour and after two glass of water one glass of salt replenishment fluid/electrolyte as a minimum).

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#### Ventilation

Increasing airflow through a work area such as installing fans and air conditioning (as practicable) shall help in increasing the evaporation rate and cooling of the workers.

In the case of working in confined space, such workplace needs to be evaluated to ensure proper ventilation is present throughout the workspace if required. Cool air should be supplied near to the workers. This may require relocation of the air movement and the opening/closing of man ways as the work progresses to ensure proper air distribution.

#### **Work Practices**

Where practical, mechanical assistance should be used to reduce the physical requirements of the job and thus reduce the metabolic rate. (For example, using carts or trolleys than physically lifting and carrying the materials).

Split the job tasks between workers proportionally so that strenuous workload to a single individual is avoided. Schedule heavy work in the cooler period of the day rather than continuously working during the hot weather.

Another method is employee's job rotation, in this case task team can be divided into two teams while one team is working, and the other team can take rest and prevent heat stress.

Also, it is recommended to work in pairs (buddy system) while performing work in a hot environment or under direct sunlight. This will help in identifying early warning signs of heat stress in his co-worker.

#### **Personal Protective Equipment**

Three variables that are insulation, permeability and ventilation associated with clothing alter the thermal balance. Cotton clothing provides most of these three variables.

Coverall (clothes) should be made of thin cotton (that eases evaporation), loose fitting, light in weight and color (that reflects heat). Clothes should be regularly washed to remove the sweat and salt which can irritate the skin and lead to further infection.

Long-sleeved shirts and trousers are recommended. However, while allowing such long sleeved shirts and loose-fitting clothes, care should be exercised that safety aspects at work are not compromised. A hard hat should be worn to protect the head, neck, and face from direct sunlight. Tinted safety glasses can reduce damage to the eyes.

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In certain situations, personal protective equipment (e.g., face masks, impermeable fire protective clothing) must be worn which can control heat stress by not allowing sweat to evaporate. Special working practices may need to be adopted.

#### Commutation of workers in hot weather

It is recommended that during hot weather conditions, the commute of workers to work location and back to their accommodation should be done through air-conditioned buses. This will help in reducing the heat stress effect on the workers during traveling and then continuing work in hot weather.

## Medical Screening of employees

A worker's individual health status is one of the major factors aggravating heat stress at work while working in a hot environment. Workers with illnesses like high blood pressure, heart and kidney related illness, diabetics, obesity, and other illnesses are more vulnerable to serious impact of heat stress. Accordingly, employers shall ensure medical screening of the workers prior to employing them for working in hot environment and maintain records of such screening.

It is recommended that the person with such illnesses should not be allowed to work in hot weather. However, if it is essential then all required support shall be provided in consultation with an approved medical professional.

#### **Communicating Heat Stress Risk levels**

Notifying workers on changing heat stress risk levels while at work is very important to reduce the impact of heat stress. Timely notification to the workers regarding changing heat index due to changes in hot weather conditions/ environment shall help in taking adequate/ defined protective measures such as stopping the work/taking rest in suitable cool shelters. The delay in notification or unawareness could lead to an increased number of heat stress illness incidents and accidents due to ill health status while at work.

This communication could be done through telecommunication/mobile messaging or using flag system (erecting different color flags such as red for very high risk, amber for high risk, yellow for medium risk and green for low or no risk situation) based on the risk level mentioned above.

This communication system is applicable where multiple teams are working at different and distant locations and a single source of monitoring of heat stress is used.

It is also recommended that if different areas are affected with different environment and the heat stress effect could be varying in these locations then each area should be provided with a separate measuring instrument for knowing and communicating the heat stress risk levels.

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## 8 Training and Awareness

Managers, supervisors, contractors, and employees must be trained to recognize symptoms of heat stress prior to performing the work in potentially heat stress situations. Training must include signs and symptoms of heat stroke, heat exhaustion, and heat cramps etc. Training must also include work rest schedules, water replenishments requirements, flagging system or other communication system related to heat index, emergency preparedness, hygiene practices, dietary control, wearing of suitable PPE's while at work and overall idea of heat stress management program.

Special training sessions to be conducted prior to the start of the summer season and shall be periodically repeated during the season.

This awareness can also be given through induction trainings conducted in the organization on joining of the new staff and key aspects of the heat stress program shall be repeated through everyday safety toolbox talks as a reminder to the work force.

In industries where hot work is part of the routine work, special training shall be conducted prior to start of the work and then refresher training to be imparted periodically to keep the heat stress management awareness during workers employment in the organization. The periodicity of the training could be biyearly or yearly as suitable for the organization.

#### Awareness on self-assessment of heat stress illnesses:

Creating awareness on self-identification of heat stress impact will help in reducing risk of serious heat stress illnesses among the workers.

Making workers aware of heat stress illness symptoms as detailed below by small training sessions (maybe periodical) shall help in reducing heat stress illness cases within the work organizations.

Another way to identify heat stress illness is by creating awareness on the change of urine colour due to heat illness. On knowing this information workers can seek further medical help for their own care and get rid of adverse effects due to heat stress.

Heat Illness	Symptoms
Heat stroke	Red, hot, dry skin or excessive sweating
	Very high body temperature
	Confusion
	Fainting
Heat Exhaustion	Cool, moist skin
	Heavy sweating
	Headache

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		T		
		Nausea or vomiting		
		Dizziness		
		Light headedness		
		Weakness		
		Thirst		
Heat Cramp		Irritability		
		Fast heart heat		
		Muscle spasms		
		Pain		
		Usually in abdomen, arms, or legs		

#### 9 Emergency Preparedness

Heat Rash

All employers shall ensure to deal with all kinds of heat emergencies, which may occur in their premises (if heat stress related work activities are being performed).

Clusters of red bumps on skin

Often appears on neck, Upper chest, folds of skin

As part of emergency preparedness, it is recommended that, employers shall have suitable arrangement/coordination with in-house/nearby medical facility which has provision of appropriate number of professionals (paramedic and/or doctor) and ambulance.

Employers shall also maintain required number of competent first aider(s) to support any medical emergencies as per UAE's/Dubai's applicable legislations/requirements.

As mentioned in the controls above, there should be air-conditioned room as part of the clinical support to treat persons exposed to heat stress.

Please remember to dial – 998 (Dubai Ambulance) or 999 in case of any kind of emergencies.

## 10 Monitoring

Organizations may conduct periodic inspections / audits to verify the implementation of heat stress program in their work premises. As overall preparedness employers are recommended to use summary checklist (refer to Annex B) to ensure required preparedness prior to start of the work in hot weather.

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	For (suggestions, comments, and		For further information
	complaints)		
•	Unified interactive platform that	■ [	⊠ <u>safety@dm.gov.ae</u>
	connects Dubai Government and its	<b>–</b> (	${\mathbb D}$ Dubai Municipality - Call Center
	customers:	(	(24/7): 800900
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•	Dubai Municipality - Call Center		
	(24/7): 800900		

## **5** References

- Canada Canadian Centre for Occupational Health and Safety
- Euro Weather Heat Index Source: Heat and Discomfort Index
- United States of America Occupational Health and Safety Administration (OSHA) Heat Index Guide
- United Arab Emirates Federal Law No. 8 (UAE Labor Law)
- United Arab Emirates Ministerial Order No. 32 of 1982
- Dubai Municipality Local Order 61 of 1991

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## **ANNEX A: HEAT INDEX**

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	40°	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73	75
	39°	43	45	47	49	51	53	55	57	59	61	63	65	66	68	70	72
	38°	42	44	45	47	49	51	53	55	56	59	60	62	64	66	67	69
	37°	40	42	44	45	47	49	51	52	54	56	58	59	61	63	65	66
	36°	39	40	42	44	45	47	49	50	52	54	55	57	59	60	62	63
	35°	37	39	40	42	44	45	47	48	50	51	53	54	56	58	59	61
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Temperature,	31°	32	33	34	35	37	38	39	40	42	43	44	45	47	48	49	50
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	29°	29	30	31	32	33	35	36	37	38	39	40	41	42	43	45	46
	28°	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
	27°	27	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
	26°	26	26	27	28	29	30	31	32	33	34	34	35	36	37	38	39
	25°	25	25	26	27	27	28	29	30	31	32	33	34	34	35	35	37
	24°	24	24	24	25	26	27	28	28	29	30	31	32	33	33	34	35
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	22°	22	22	22	22	23	24	25	25	26	27	27	28	29	30	30	31

#### **Relative Humidity**

#### Legend:

Up to 29°C	No discomfort
From 30 to 34°C	Slight discomfort sensation
From 35 to 39°C	Strong discomfort. Caution: limit the heaviest physical activities
From 40 to 45°C	Strong indisposition sensation. Danger: Avoid efforts
From 46 to 53°C	Danger: stop all physical activities
Over 54°C	Death danger: imminent heat stroke

URINE CHART: Monitor Your Hydration Levels: A good indicator of dehydration is if your urine is unusually dark in color.



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# **ANNEX B: HEAT STRESS CHECKLIST**

Heat Stress Checklist: Check This Guide Before Starting Work Each Day:				
Workplace Assessment related to Heat Stress	Have you conducted workplace assessment related to heat stress?			
	Based on the assessment have you placed all the applicable controls at the workplace?			
Water and/or Hydration Drink	Is there plenty of cool drinking water and/or electrolyte replacement drink located as close as possible to the workers?			
	Are coolers refilled throughout the day?			
Shade/ Welfare Facilities	Are there shade/welfare facilities available for breaks and if workers need to recover?			
Training	Do workers know the:			
	Common signs and symptoms of heat illness?			
	Proper precautions to prevent heat illness?			
	Importance of acclimatization?			
	Importance of drinking water frequently (even when they are not thirsty)?			
	Steps to take in case of emergency?			
Supervision	Is work being supervised by competent person when working near heat related sources?			
	Have you conducted periodic inspections daily or monthly?			
Emergencies	Does everyone know who to notify if there is an emergency?			
	Can workers explain their location if they need to call an ambulance?			
	Does everyone know who will provide first aid?			
Worker Reminders	Drink water (1 cup every 20 min.) and Hydration drink (1 cup, 2-3 times a day)			
	Wear lightweight clothing made of breathable fabric			
	Rest in the shade			
	Watch yourself and your coworkers			
	Report heat symptoms early			
	Know what to do in an emergency			

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