



Lusail Real Estate Development Company

Health, Safety, Security, Environment, Logistics & Quality Department

Lusail Safety Management Guidelines – Heat Stress Guideline

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1. Introduction

Qatar's summer climate is very hot and humid with summer temperatures ranging from 33°C to 50°C with relative humidity up to 100%. This climate creates a potentially dangerous situation for those exposed to the heat. Jobs involving operations in hot environment where high air temperatures, radiant heat sources, high humidity, or strenuous physical activities have a high potential to induce heat related illness and injuries to employees engaged in such operations.

The aim of this guideline is to protect the health of the worker from heat related illness and injuries resulting from exposure to heat.

This is based on the normal risk based approach.

- The hazard must be identified (Recognition).
- It must be measured (Evaluation).
- The hazard must be reduced or mitigated (Control).

The supervisor or foreman is critical in controlling heat stress among the workers who are potentially exposed to conditions that can promote heat related illness. The supervisor can implement controls when heat stress conditions are identified which will protect the workers, if properly assigned and carried out.

The workers must be trained to recognize the heat stress signs, symptoms and environmental conditions to be ready to protect themselves and those around them. These guidelines identifies fundamental practices and methods of identification of factors that could lead to heat stress and the associated illnesses and provides work practices and other controls that can mitigate or reduce the hazards.

2. Scope

This Heat Stress Prevention guideline addresses heat stress identification, evaluation and controls to be implemented to reduce effects of heat related illness & injures such as heat stroke, heat exhaustion, heat cramp, heat rashes, heat fatigue and dehydration among the workers throughout Lusail.

This guideline is applicable to all personnel within the Lusail Real Estate Development Company (LREDC) footprint including and not limited to Contractors, Developers, Consultants and visitors at all worksites and projects that require individuals to work outdoors in a hot climate.

3. Abbreviations & Definitions

Term	Description
HSE Dept.	Health Safety & Environment Department
PPE	Personal Protective Equipment
HI	Heat Index
Acclimatization	This is a gradual physiological adjustment process that the body makes to improve an individual's ability to tolerate heat. Acclimatization usually takes several days with gradual build up to expected heat loads, workloads, and duration of the job.
Buddy system	Pairing of co-workers or team members for the purpose of health protection and looking out for one another.
Heat Index	An index that combines air temperature and relative humidity in an attempt to determine the human-perceived equivalent temperature
Heat Related Illness	Any of the following terms: Heat Stress, Heat Exhaustion, Heat Stroke, brought on by excessive exposure to heat without adequate water, shelter and proper acclimatization.

Term	Description
Dry Bulb Temp. or Air Temp. (DB)	The dry bulb or air thermometer measures the ambient air temperature. This measurement is used in the heat index calculation. A series of white plates surround the sensor to shield it from radiant heat.
Globe Temperature (GT)	The globe thermometer gives an indication of the radiant heat exposure on an individual due to either direct light or hot objects in the environment. This is accomplished by placing a temperature sensor inside a blackened copper sphere and measuring the temperature rise.
Natural Wet Bulb Temperature (WB)	The natural wet bulb thermometer gives an indication of the effects of humidity on an individual. Relative humidity and wind speed are taken into account by measuring the amount of evaporative cooling taking place by a thermometer covered with a moistened wick. A cotton wick immersed into a reservoir containing distilled water is usually used to take natural wet bulb measurements. This measurement is used in calculating the heat index.
Relative Humidity (RH)	Relative humidity is the ratio of the quantity of water vapour present in the air to the quantity that would saturate it at any specific temperature.

4. Heat Stress & Heat Index

Heat stress occurs when heat is absorbed from the environment faster than the body can get rid of it. The resulting strain on the body comes from the combined contributions of the job (e.g. work activity), environmental factors (e.g. air temperature, humidity, air movement, radiant heat), and worker factors (e.g. extent of acclimatization and hydration).

The "Heat Index" has been selected to define general overall heat stress conditions for the workforce. The heat index, also known as "effective temperature", is useful as a first order indicator of the effect of humidity on how hot a particular exposure feels to an individual. It includes no evaluation of the effect of either convective or radiative heat exchange, and does not consider the rates of heat gained by physical activity. The heat index does not take into account air velocity which is a major factor in removing heat and water vapour by convection from the skin and clothing surfaces. The heat index combines relative humidity and air temperature. It is predictive of heat stress in circumstances in which the relationship has been established for a particular environment.

The heat index indicates thermal comfort. When the relative humidity is elevated the evaporative process is restricted which reduces the cooling effect of perspiration. The heat index does not take into account the radiant heat load which is primarily attributed by working in direct sunlight. It also does not take into account the nature of the work (heavy manual work or light work) nor the clothing worn by the worker. The heat index can be obtained by directly measuring the dry bulb temperature and relative humidity and reading the corresponding heat index from the heat stress table.

When the heat index reaches levels that have been known to produce heat illness, additional work practices to reduce the heat stress should be implemented to reduce the effects of the radiant heat load, physical activity, and isolative effect of the clothing and personal protective equipment. Refer to the work practices in the "Control" section.

Instrumentation to determine the heat index must be utilized to measure the air temperature in full shade conditions and measure or calculate the relative humidity. The heat index will be determined using properly calibrated instruments and in accordance with manufacturer's recommendations.

4.1 Heat Disorder & Heat Effect

Heat Fatigue

A factor that predisposes an individual to heat fatigue is lack of acclimatization. The signs and symptoms of heat fatigue include impaired performance of skilled mental, or vigilance jobs. There is no treatment for heat fatigue except to remove the heat stress before a more serious heat-related condition develops.

Heat Rashes

The most common problem in hot work environment, prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by un-evaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to cool environment.

Heat Cramps

These are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating and lack of water replenishment. Thirst

cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

Heat Collapse

In heat collapse, the brain does not receive enough oxygen because blood pools in the extremities. As a result, the exposed individual may lose consciousness. This reaction is similar to that of heat exhaustion and does not affect the body's heat balance. However, the onset of heat collapse is rapid and unpredictable. To prevent heat collapse, the worker should gradually become acclimatized to the hot environment.

Heat Exhaustion

Heat exhaustion should not be dismissed lightly, however, for several reasons. One is that the fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, a medical emergency. Signs and symptoms: headache, nausea, vertigo, weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment.

Heat Stroke

Heat stroke is a form of hyperthermia, an abnormally elevated body temperature with accompanying physical and neurological symptoms. This occurs when the body's system of temperature regulation fails and body temperature rises to critical levels. Primary signs and symptoms of heat stroke: confusion; irrational behaviour; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature (106°F - 41°C).

4.2 Factors contributing to Heat Stress

Heat stress is normally brought about by a range or combination of factors involving the interaction of the Activity/task, environment and the employee.

4.2.1 Activity / task Factors

- Frequency of exposure
- Duration of exposure
- Physicality of work
- Inadequate rest periods

4.2.2 Activity / task Factors

- High air temperatures
- Low air movement
- High relative humidity
- Radiant heat from hot objects such as machinery

4.2.3 Environmental Factors

- High air temperatures
- Low air movement
- High relative humidity
- Radiant heat from hot objects such as machinery

4.2.4 Employee Factors

- Incomplete acclimatization
- Dehydration
- Excessive or inappropriate clothing
- Medical Condition
- Individual Susceptibility (age, overweight, poor physical condition)

5. Heat Stress Control

Controls can be applied to the work situation which could be defined as work practices, personal, administrative, or engineering. Apply them to fit the nature of the task depending on the specific situation.

5.1 Engineering Control

Feasible engineering controls will be sought and implemented, where practicable to do so, to reduce the heat load on an individual. This may include the following:

5.1.1 Shade & Shielding

- Shade is one of the most important heat stress controls for this climate. Radiant heat load can be reduced as much as 10°C degrees when working in shade vs the direct sunlight. (Wind screens provide some measure of shade yet allow significant radiant heat through and reduce ventilation.)
- Radiant heat sources such as hot pipes in regular work areas should be insulated to reduce heat load. Re-insulation, either temporary- or permanent should be done as soon as possible after repairs.
- For non-routine work areas without insulation on hot sources temporary-insulating blankets should be used to shield the sources while work is being done in the area.
- As a minimum guideline, the shaded area must have green net on all the sides including the top to prevent direct sun light with seating arrangements to rest. Cool drinking water is to be provided with glasses/flasks to drink. Necessary drainage arrangements are to be made to drain the excess water. Using hands as a means to drink water is to be avoided. Food may only be consumed in the designated dining facilities.

5.1.2 Area Cooling

- Spot cooling equipment such as misting fans can be utilized when the work is in one fixed location such as a valve or control box. The cool air flow streams need to be directed towards the workers and the discharge ducts should be as close as practical to the work area.
- Portable trailer mounted air conditioning units can be utilized for larger enclosed areas such as confined spaces or vessels. These units can help to significantly reduce heat stress and greatly increase the job efficiency.

- Shaded break areas should be kept cooler than the work areas to facilitate quicker recovery from the effects of heat. It is recommended that a 10-15 degree difference in temperatures to be maintained between work area and break area. This will avoid excessive cooling which is not recommended except for heat emergencies. Where cooling of a break area is not feasible, air circulation with fans should be used to help with cooling through sweat evaporation.

5.1.3 Ventilation

- Increasing airflow through a work area, such as fans and air conditioning, will help increase the evaporation rate and cooling of the people. This will not be effective if the temperature of the air blowing across the workers is over 40 °C since it may then actually result in increased heat stress.
- Confined spaces should be evaluated for proper ventilation. If needed, cool air should be pulled in near the workers. This may require relocation of the air movers and the opening/closing of man ways as the work Progresses to assure proper air distribution.

5.2 Administrative Controls & Work Practices

5.2.1 Acclimatisation

The human body can adapt to heat exposure to some extent. This physiological adaptation is called acclimatization. After a period of acclimatization, the same activity will produce fewer cardiovascular demands. The worker will sweat more efficiently (causing better evaporative cooling), and thus will more easily be able to maintain normal body temperatures.

A properly designed and applied acclimatization program decreases the risk of heat-related illnesses. Such a program basically involves exposing employees to work in a hot environment for progressively longer periods.

5.2.2 Work Scheduling

- Scheduling extremely hot jobs for the cooler part of the day, at night or for a cooler day if possible.
- Where possible, postpone the hot job until equipment can be taken out of service and allowed to cool down.
- Schedule additional time for hot jobs to allow for additional cooling breaks especially if cooling measures are not used.

5.2.3 Work Rest Intervals

- On hot days or for hot jobs, more frequent breaks should be planned especially if heavy work is involved.
- Rest breaks should be taken in a cool location and cool fluids consumed. Avoid hot beverages and those that contain caffeine such as tea, coffee and sodas.

5.2.4 Self Evaluation

- Each person while working in hot conditions (high temperatures) must be aware of the signs and symptoms of heat stress related illnesses and early warning indications, so they can recognize them in themselves or their colleagues. Typical symptoms include weak and fatigue, painful muscle cramps, headache and dizzy, nauseated, heavy sweating.
- The supervisor should be notified of any early indications and corrective action taken.
- Heart rate (rapid pulse) is one of good indicators of the degree of heat stress that a person is experiencing.
- Most individuals can be trained to monitor their own heart rate. On jobs where heat stress is a concern periodically pause work and immediately take a pulse for 15 seconds. Multiply this by 4 to get the heart rate.
- Healthy acclimatised workers should avoid prolonged work or environmental combinations that cause their heart rate to exceed the recommended maximum heart rate, maximum heart rate when taken during the first minute of rest. The heart rate should drop to 110 – 120 beats per

minute following the first minute of rest. Maximum heart rates should be below the following levels.

Age	Max.Rate
20	162
30	157
40	152
50	147
60	141

Since each person is different and medical conditions can affect reaction to heat stress, it is important to remember that these are only average indicators. The individual's maximum recommended rate could be lower. Workers must remain alert to other signs of excessive heat stress.

5.2.5 Employee Rotation

- On hot jobs two groups of workers could be used to allow frequent rotation out of the hot area and cooling off. Tasks such as pick or shovel work must be rotated frequently (each 10-15 minutes). Workers in additional clothing or suits must be rotated more frequently. If in chemical protective suits or proximity suits, additional cooling devices must be used or workers must be rotated each ten minutes.

5.2.6 Fluid Replacement

- One of the most important means of reducing the risk of heat stress is drinking plenty of fluids (cold water). When doing hard work in hot areas dehydration may occur due to heavy sweating before a person even feels thirsty. It is recommended that at least one half litre of fluids be consumed every 20 minutes to prevent dehydration and reduce the risk of illness. Refer to the dehydration guide utilizing urine colour.
- Cool water should be readily available during warm weather or in hot work areas.
- Salt tablets are not recommended. A well balanced diet should replace all necessary salts and electrolytes.

5.2.7 Buddy System

- When working on high temperature jobs, consideration should be given to working in pairs with each person watching out for early warning signs of excessive heat stress in the other person.
- In high temperature confined spaces, the man on watch should be alert to the warning signs of excessive heat stress and should ensure that any conditions of entry such as frequent rest and water breaks are followed.

5.2.8 Reduce Internal Heat Generated by the Worker

- Where practical, mechanical assistance should be used to reduce the physical requirements of the job and thus reduce the metabolic rate. For example use an appropriate lifting equipment / transportation to move material rather than making several trips using heavy loads. Use a backhoe for digging or spreading of gravel rather than manual handwork digging.
- The split job tasks or rotation between workers will relieve a lot stress besides giving them an opportunity to take rest pauses.

5.2.9 Flagging System

- Use of colour coded flagging system in accordance with the Heat Stress Index is strongly recommended at all work place area to ensure that the Heat Stress Management system is consistently applied throughout the work sites.
- Besides the flagging system, boards which are currently under use are also suggested / recommended with periodic updates with respect to the Heat Index.

5.3 Personal Protective Equipment

- Three variables associated with clothing alter thermal balance: insulation, permeability and ventilation. Cotton clothing provides most of these variables. Clothes should be made of thin cotton (eases evaporation) loose fitting, light in weight and colour (reflects heat). Clothes should be regularly washed to remove the sweat and salt which can irritate the skin and lead to infection. Long sleeved shirts and trousers are recommended. A hardhat should be worn to protect the head face and neck. Tinted safety glasses can reduce damage to the eyes.
- In certain situations personal protective equipment (eg: face masks, impermeable fire protective clothing) must be worn which can aggravate heat stress by not allowing sweat to evaporate. Special working practices may need to be adopted. There are synthetic under garments made up of combed cotton and polyolefin fibres which wick moisture away from the skin leaving the body dry.
- Cooling devices (e.g. ice vests, water circulating cool suits, air circulating, and reflective clothing) may need to be worn for very specific tasks. However because they represent a potential safety hazard a work assessment should be performed prior to their employment.

6.0 Training

- Supervisors, contractors and employees must be trained to recognize symptoms of heat stress prior to performing work in potentially heat stress situations.
- Training must include recognition of signs and symptoms of heat stress in themselves and co-workers, work rest schedule, emphasis on fluid intake, flagging system.
- Training should be conducted closer to the summer months to ensure awareness among workers. This can take place at “toolbox” talks and or JSA discussion sessions at the beginning of each shift.
- Display heat stress awareness posters/ charts be written in as many common languages used by the workers.

7.0 Roles & Responsibilities

7.1 End Users & Contractors Management

Each Contractors, Developers, Consultants and visitors is required to ensure that these guidelines are taken up on their respective Heat Stress Management System and that it is followed without exception.

All Heat Stress or Heat Stress related incidents must be reported to LREDC immediately.

- Provide Heat Stress Index measurement regularly on day to day basis to site staff.
- Review heat stress precautions in respect of work to be performed in hot locations.
- Consider scheduling the hottest jobs for the cooler part of the day or nights, or the use of other methods to reduce heat stress.
- Scheduling, plan for additional breaks, as needed, to cool off on hot jobs in particular hot conditions.
- Evaluate non-routine jobs where there may be a heat stress concern.
- Stop work as and when required in terms at Heat Index indicator.
- Adjust work practices as necessary when workers complain of heat stress.
- Make controlling exposures through engineering controls the primary means of control wherever possible.
- Oversee heat stress training and acclimatization for new workers, workers who have been off the job for a while, and workers with medical condition.

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- Provide workers education and training, including periodic safety talks on heat stress during hot weather or during work in hot environments.
 - Monitor the workplace to determine when hot conditions arise.
 - Determine whether workers are drinking enough water.
 - Determine a proper work/rest regime for workers.
 - Arrange first-aid training for workers.

7.2 Medical Officer

- Make sure that all Heat Stress related incidents reported are properly investigated and recorded.
- Report immediately any Heat Stress incident to HSE Department of LREDC.
- Follow up and coordinate Heat Stress related incidents with the End user medical staff.

7.3 Employees

- Be familiar with the early warning signs of heat stress in themselves and co-workers and take immediate action when they are noted.
- Utilize personal protective equipment as needed.
- Drink plenty of fluids prior to entering a hot environment and continuously when indicated to prevent dehydration (1/2 litre every 20 minutes).
- Take regular rest breaks and follow flagging system
- Inform the supervisor of any heat stress concerns relating to the work place.
- Follow instructions and training for controlling heat stress
- Be alert to symptoms in yourself and others
- Avoid consumption of alcohol, illegal drugs, and excessive caffeine.
- Find out whether any prescription medications you're required to take can increase heat stress
- Get adequate rest and sleep
- Drink small amounts of water regularly to maintain fluid levels and avoid dehydration.

7.4 Supervisors

- Implement heat stress controls in accordance with the heat index.
- Monitor subordinates exposure to heat and modify work schedules accordingly.
- Apply effective controls to control the heat at work.
- Schedule the most physical activities, if possible for the coolest part of the day.
- Provide cool water and encourage employees to drink fluids regularly. As the intensity of work activity and heat index climbs, increase more fluids.
- Employ the buddy system which encourages fellow employees to look out for each other.
- Ensure employees are aware of the symptoms of Heat stress. Employee training should also be focused on protective measures for working in high heat and humidity in work place areas.

8.0 Implementation and Auditing

- Implementation and auditing of this guideline must be done by the respective HSE Department.
- Any heat related incidents are to be reported with questionnaire to the Lusail Occupational Department and HSE Department.

9.0 References

- OSHA Technical Manual, Section III: Chapter 4 – Heat Stress.
- Heat Stress Guidelines & Recommendation – Supreme Council of Health - Qatar

- LUS-HSE-WG3.446-036.01 Heat Stress Management
- LUS-HSE-WG3-446-056.05 Workers Accommodation Requirements Section 17.0 CONSTRUCTION SITE STANDARDS
- LUS-HSE-WG3-432-001 HSE GENERAL REQUIREMENTS

10.0 Appendices

- Appendix 1 - Heat Index Chart
- Appendix 2 - Guide on Work Practices to Minimize the Effect of Heat Exposure
- Appendix 3 - Urine Chart
- Appendix 4 - Heat Stress and First Aid Heat Stress Questionnaire
- Appendix 5 - Heat Stress Questionnaire
- Appendix 6 – Flag System

Appendix 1 - Heat Index Chart

Heat Stress General Guidelines & Heat Index Table

		HEAT STRESS TABLE																					
		Relative Humidity %																					
		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Temperature (C)	52	Stop Work - Implement Black Flag Work Procedure																					
	51	Stop Work - Implement Black Flag Work Procedure																					
	50	Stop Work - Implement Black Flag Work Procedure																					
	49	49	49	49	50	55	59	55	71	Stop Work - Implement Black Flag Work Procedure													
	48	48	48	48	49	53	57	52	57	73	Stop Work - Implement Black Flag Work Procedure												
	47	47	47	47	47	51	55	59	54	70	Stop Work - Implement Black Flag Work Procedure												
	46	46	46	46	46	49	53	57	51	66	72	Stop Work - Implement Black Flag Work Procedure											
	45	45	45	45	45	47	51	54	58	63	68	73	Stop Work - Implement Black Flag Work Procedure										
	44	44	44	44	44	46	48	52	56	60	64	69	75	Stop Work - Implement Black Flag Work Procedure									
	43	43	43	43	43	44	47	49	53	57	61	65	70	Stop Work - Implement Black Flag Work Procedure									
	42	42	42	42	42	42	45	47	50	54	58	62	66	71	Stop Work - Implement Black Flag Work Procedure								
	41	41	41	41	41	41	43	45	48	51	54	58	62	67	72	Stop Work - Implement Black Flag Work Procedure							
	40	40	40	40	40	40	41	43	46	48	51	55	59	63	67	72	Stop Work - Implement Black Flag Work Procedure						
	39	39	39	39	39	39	40	41	43	46	49	52	55	59	63	67	72	Stop Work - Implement Black Flag Work Procedure					
	38	38	38	38	38	38	38	39	41	43	46	49	52	55	59	63	67	71	Stop Work - Implement Black Flag Work Procedure				
	37	37	37	37	37	37	37	38	39	41	43	46	49	51	55	58	62	66	70	Stop Work - Implement Black Flag Work Procedure			
	36	36	36	36	36	36	36	36	38	39	41	43	46	48	51	54	58	61	65	69	74	Stop Work - Implement Black Flag Work Procedure	
	35	35	35	35	35	35	35	35	36	37	39	41	43	45	48	50	53	57	60	64	68	72	Stop Work - Implement Black Flag Work Procedure
	34	34	34	34	34	34	34	34	34	35	37	38	40	42	44	47	49	52	55	58	62	66	Stop Work - Implement Black Flag Work Procedure
	33	33	33	33	33	33	33	33	33	34	35	36	38	40	42	44	46	48	51	54	57	60	Stop Work - Implement Black Flag Work Procedure
	32	32	32	32	32	32	33	33	33	33	33	34	36	37	39	40	42	44	47	49	52	54	Stop Work - Implement Black Flag Work Procedure
31	31	31	31	31	31	31	31	31	31	32	33	34	35	36	38	39	41	43	45	47	49	Stop Work - Implement Black Flag Work Procedure	
30	30	30	30	30	30	30	30	30	30	30	30	31	32	33	34	35	36	38	39	41	42	44	Stop Work - Implement Black Flag Work Procedure

Appendix 2 - Guide on Work Practices to Minimize the Effect of Heat Exposure

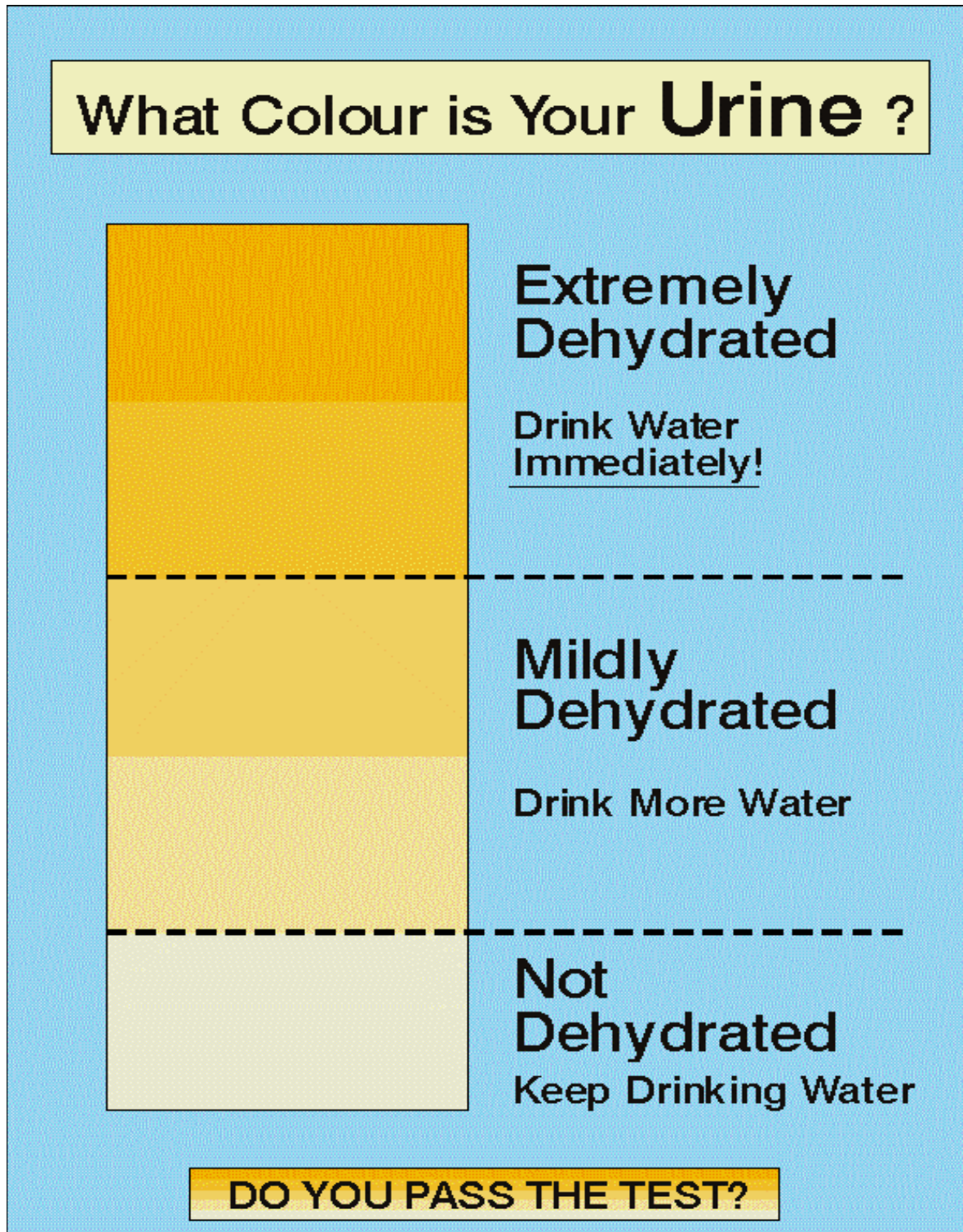
Heat Stress Index				
Danger Category	Humidex Value	Heat Syndrome	Resting Time	Water Needed
Extreme Danger	>54c	Heat stroke or sun stroke imminent	*All Work Stopped	
Danger Category	39c - 53c	Sunstroke, heat cramps or heat exhaustion likely. Heat stroke possible with prolonged exposure and physical activity	10 minutes/ hour Elevated work to be closely controlled or stopped	1 glas / 10 minutes
Extreme Caution	32c - 38c	Sunstroke, heat cramps or heat exhaustion possible with prolonged exposure and physical activity	7 minutes / hour	1 glass / 15 minutes
Caution	27c - 31c	Fatigue possible with prolonged exposure and physical activity	Normal / Scheduled	1 glass / 20 minutes

1 Glass = 250 ml

*Note: For Heat index > 54 - Safety / Integrity Critical Activities will be allowed to continue subject to maximum 20 min of work and minimum of 20 min rest.

Do not drink more than 1.5 litres per hour (maximum water absorption rate of human body)

Appendix 3 - Urine Chart



Appendix 4 – Heat Stress Disorders


CONDITION	CAUSE	SYMPTOMS	TREATMENT	PREVENTION
Heat Rash	Hot humid environment, plugged sweat glands.	Red bumpy rash with severe itching.	Change into clean dry cloths often and avoid hot environment. Rinse skin with cool water.	Wash regularly to keep skin clean and dry
Heat Cramps	Heavy sweating from strenuous physical activity drains a person's body of fluid and salt, which cannot be replaced just by drinking water. Cramps occur from salt imbalance resulting from failure to replace salt lost from heavy sweating.	Painful cramps commonly in the most worked muscles, (arms, legs or stomach) which occur suddenly at work or later at home. Heat cramps are serious because they can be a warning of other more dangerous heat induced illnesses.	Move to a cool area; loosen clothing, gently massage and stretch affected muscles and drink cool salted water (1/4 to ½ tsp. salt in 1 litre of water) or balanced commercial fluid electrolyte replacement beverage. If the cramps are severe or don't go away after salt and fluid replacement, seek medical aid. Salt tablets are not recommended.	Reduce activity levels and or heat exposure. Drink fluids regularly. Workers should check on each other to help spot the symptoms that often precede heat stroke.
Fainting	Fluid loss, inadequate water intake and standing still, resulting in decreased blood flow to brain. Usually occurs in people who have not been acclimatized.	Sudden fainting after at least 2 hours of work, cool moist skin; weak pulse.	GET MEDICAL ATTENTION: assess need for CPR. Move to a cool area; loosen clothing; make person lie down; and if the person is conscious offer sips of cool water. Fainting may also be due to other illnesses.	Reduce activity levels and or heat exposure. Drink fluids regularly. Move around and avoid standing in one place for too long. Workers should check on each other to help spot the symptoms that often precede heat stroke.
Heat Exhaustion	Fluid loss and inadequate salt and water intake causes a person's body cooling system to start to break down.	Heavy sweating; cool moist skin; body temperature over 38c; weak pulse; normal or low blood pressure; person is tired and weak, and has nausea and vomiting; is very thirsty or is panting or breathing rapidly; vision may be blurred.	GET MEDICAL ATTENTION; This condition can lead to heat stroke, which can kill. Move the person to a cool shaded area; loosen or remove excess clothing; provide cool water to drink; fan and spray with cool water. Do not leave affected person alone.	Reduce activity levels and or heat exposure. Drink fluids regularly. Workers should check on each other to help spot the symptoms that often precede heat stroke

Heat Stroke	If a person's body has used all its water and salt reserves, it will stop sweating. This can cause the body temperature to rise. Heat stroke may develop suddenly or may follow from heat exhaustion.	High temperature (over 41c) and any one of the following: The person is weak, confused, upset or acting strangely; has hot dry; red skin; a fast pulse; headache or dizziness. In later stages, a person may pass out and have convulsions.	CALL AMBULANCE. This condition can kill a person quickly. Remove excess clothing; fan and spray the person with cool water if the person is conscious.	Reduce activity levels and or heat exposure. Drink fluids regularly. Workers should check on each other to help spot the symptoms that often precede heat stroke.
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Appendix 5 - Heat Stress Questionnaire

Heat Stress Questionnaire

Please complete the below questions for all Heat stress relevant cases and return completed questionnaire to the Lusail Occupational Health Department and HSE Department. This will be used to gather statistical data for lessons learned and continuous improvement for the prevention of Heat stress related cases.

Name		Date of Incident	
Nationality		Age	
Job Trade		Contact Details	
Company Name		Location of Incident	
Project			
1	How long are you working in Qatar?		
	How long are you working in a day - shift timings?		
	What are the intervals of your work - Rest Breaks?		
3	Were you given time to acclimatize	Yes	No
4	Did you have your breakfast/lunch?	Yes	No
5	Are you on any medication (sedatives)?	Yes	No
	If yes, please provide details -		
6	Did you receive any training on Heat Stress from your company? (eg. Induction training, Toolbox Talks, handouts)	Yes	No
7	Do you use the flag system on your work site?	Yes	No
8	What was the flag colour when you started to feel sick?		
			
9	Do you have a rest shelter on site with extra ventilation? (eg, Fans, A/C)	Yes	No
10	Do you have clean and cool drinking water at your work area?	Yes	No
11	Do you check your urine's colour?	Yes	No
12	Do your supervisor enforce the rest breaks/	Yes	No
Interviewed by:			

Name		Department	
Company		Date & Sign	

Appendix 6 – Flag System Recommended for Use



Heat Stress Guidelines – Flag System



- >54c
- **STOP ALL WORK**



- 39c - 53c
- 10 minutes rest / hour
- Elevated work to be closely controlled or stopped
- 1 glass water / 10 minutes



- 32c - 38c
- 7 minutes rest / hour
- 1 glass water / 15 minutes



- 27c - 31c
- Normal / Scheduled
- 1 glass water / 20 minutes