Human Resources and Social Development

National Council for Occupational Safety & Health

Procedural Guidelines

for Occupational Safety and Health

for preventing the Effects of Exposure to The Direct Sun and Heat Stress

1442 - 2021

1- Introduction

The Ministry of Human Resources and Social Development has prepared the Manual for the prevention of the effects of exposure to working in hot places, which has relied on a number of relevant international technical and standard references and specifications as inputs and sources of information.

Since the negative effects and special occupational diseases resulting from the direct exposure to sunlight and heat stress in the workplace with long and frequent exposure, work was carried out on developing controls and instructions for preserving the safety and health of workers in the workplace.

2- Scope

This Manual is about the occupational safety and health requirements related to work in the hot environments by clarifying roles, responsibilities and preventive procedures from risks and impacts, through providing the mentoring and education programs, as well as the need to provide preventive occupational safety and health requirements in all workplaces, and responding to emergencies from exposure to work risks in hot places.

3- Terms and Definitions

3.1- Sunstroke (Heat stroke):

A person is exposed to sunstrokes, as a result of prolonged exposure to hot and humid weather, with the body's inability to dispose of liquids by sweat.

3.2- Heat Stress:

A person develops a heat stress as a result of exposure to hot and humid weather, leading to the loss of many fluids from the body through profuse sweats such as occurs with Hajj and Umrah performers, as well as during running in very hot weather.

3.3- Heat Rash:

Skin irritation resulting from the extreme sweating during summer and heat, and the heat rash occurs when skin glands are blocked and sweat is retained under the skin.

3.4- Heat Cramps:

Involuntary muscle cramps that affect the human body and is very painful, usually occur when a person is sweating and doing hard work, such as long work, excess movement, physical exercise, and brisk walking.

3.5- Heat Syncope:

A case of sudden syncope that affects a person when standing for long hours and sitting suddenly, as a result of an aneurysm in the body.

4- Roles and Responsibilities

4.1- Employer:

One of the most important responsibilities of the employer is to provide resources to ensure achieving the following:

4.1.1:

Providing training, counselling and education for all management levels, and workers exposed to working in hot places with symptoms related to the heat exposure such as: Heat stroke, dehydration and other, as well as prevention methods.

4.1.2:

Providing personal protective equipment for workers such as: Head protective cap.

4.1.3:

Providing a trained person to observe and respond to situations resulting from high temperatures during work.

4.1.4:

Providing a device for temperature and relative humidity to measure degrees at variable intervals during work (See appendix 5.1).

4.1.5:

Providing fluids to workers, the most important of which is cold potable water.

4.1.6:

Scheduling in the coldest times of the day.

4.1.7:

Taking all precautions, engineering designs, control and engineering implementation that allow heat reduction.

4.1.8:

Conducting an evaluation of work risk in hot work places to identify persons with possible exposure to it and identify preventive measures.

4.1.9:

Ensuring the application of the Ministry of Human Resources and Social Development's Regulations on suspending work in the afternoon of the summer months mentioned in the Regulations.

4.1.10:

Ensuring that workers exposed to the risks of working in hot places are given adequate breaks.

4.1.11:

Ensuring the adaptation process for experienced or new workers to work in hot weather (See appendix 5.2).

4.1.12:

Ensuring that all workers exposed to the risks of working in hot places are examined and medically fit.

4.1.13:

Providing a dedicated, suitable and prepared place to spend breaks for workers.

4.1.14:

Providing a bright colors uniform for workers, preferably of light, loose cotton.

4.2- Safety Officer/Worker Supervisor:

One of the most important responsibilities of the employer is to provide resources to ensure achieving the following:

4.2.1:

Providing a brief explanation of the work and the resulting risks to workers prior to commencing the work.

4.2.2:

Following-up on workers and ensuring that they wear the appropriate personal protective equipment during work.

4.2.3:

Filling in the worksite check form before commencing the work
(See appendix 5.3).

4.2.4:

Ensuring that atmospheric temperature and relative humidity are appropriate as per the heat index before doing work (See appendix 5.1).

4.2.5:

Ensuring that fluids, especially water, are available in the workplace.

4.2.6:

Observing the physical condition of workers.

4.3- Workers:

One of the most important responsibilities of the workers is to ensure achieving the following:

4.3.1:

Ensuring that they wear light-colored, loose clothes, like cotton clothes.

4.3.2:

Drinking cold water and liquids continuously.

4.3.3:

Reducing the drinking of fluids containing caffeine or excessive amounts of sugar.

4.3.4:

Taking breaks at designated places of breaks.

4.3.5:

4.3.5 Ensuring to obtain enough sleep at night.

4.3.6:

Informing the supervisor or safety officer in case of stress or fatigue symptoms.

4.4- Most prominent factors controlling the risk of working under sunshine or hot places:

4.4.1:

Temperature and humidity.

4.4.2:

Time period of exposure.

4.4.3:

Activity nature (Exerted effort in work).

4.4.4:

Workplace (Open, closed, ventilated or blocked place).

4.4.5:

Worker sex and age.

4.4.6: Worker health condition.

4.5- Sunstroke symptoms:

4.5.1:

Headache, dizziness and fatigue.

4.5.2:

Different levels of consciousness.

4.5.3:

Skin: Dry and hot (may be wet in some conditions)

4.5.4:

Pulse: Quick and weak.

4.5.5:

Muscle cramps.

4.5.6:

Dilated pupils.

4.6- First aid procedures in case of exposure to the sunstroke:

4.6.1:

Transferring the infected person to a cold place and removal their external clothes.

4.6.2:

Wrapping the infected person in wet coverlet every 10 minutes until their temperature decreased.

4.6.3:

Placing the infected person in an air current (Fan or air conditioner).

4.6.4:

Spraying the infected person body with the cold water if the coverlet is not available.

4.6.5:

Contacting the emergency number in the workplace or contacting 997 (Red Crescent Operations)

4.7- Heat stroke symptoms:

4.7.1:

Headache, dizziness and fatigue.

4.7.2:

Nausea and vomiting.

4.7.3:

Skin: Wet, sweaty, and pale-colored.

4.7.4:

Cramping and pain in muscles.

4.7.5:

Breathing: Quick and shallow.

4.7.6:

Pulse: Quick and weak.

4.8- First aid procedures in case of exposure to the heat stroke:

4.8.1:

Transferring the infected person to a cold place and removal their external clothes.

4.8.2:

Drinking excessive amounts of fluids, dehydration treatment solution or saline solution (Half a teaspoon of salt per half a liter of water).

4.8.3:

Laying the infected person down on their back, with raising their feet at a higher level than their body.

4.9- Sunstroke symptoms:

4.9.1:

Adding heat insulation materials in building roofs at work sites.

4.9.2:

Providing shaded work places.

4.9.3:

Providing air-conditioned work places.

4.9.4:

Using an exhaust ventilation system over the heat generating operations area.

4.9.5:

Using ventilation cooling system with air blasting fans to increase the air flow.

5- Appendixes

5.1- Heat Index

We recommend using the heat index to classify the work scopes as per the temperature and humidity of the workplace, and from these scopes we can determine the preventive measures to reduce the exposure to heat risks by applying a observing system for rising atmospheric temperatures conditions, controlling breaks, and choosing the coldest times of the day to conduct works.

The heat index consists of two parts: Atmospheric temperature and relative humidity.

The index indicates the actual temperature that the human body feels. When the index gives a high temperature, the risk of occupational injury and illness related to working in hot places increases.

Heat Index				
Risk degree	**Heat Index °C**	**Symptoms/illnesses of exposure to high temperature**	**Breaks**	**Need to water per hour**
CAUTION	29-25	Possibility of developing fatigue upon the prolonged exposure or hard physical effort	Scheduled usual position	4-6 cups*
EXTREME CAUTION	38-30	Possibility of muscle cramps, heat stroke, sunstroke upon the prolonged exposure or hard physical effort	25% of working hours divided in equal breaks	4-6 cups*
DANGER	51-39	Most probably of exposure to muscle cramps, heat stress, sunstroke upon the prolonged exposure or hard physical effort	50% of working hours divided in equal breaks	4-6 cups*
EXTREME DANGER	52+	Is about to being exposure to a sunstroke	75% of working hours divided in equal breaks, and It is recommended that the work is suspended when the heat index reaches 56 and more.	4-6 cups*

*One cup = 250 ml

5.2 Steps of adaption of workers exposed to working in hot places:

The adaption of workers to work in hot places is according to the percentages shown in the table below:

Workers adaption steps		
Day	Experiences workers	New workers
1	50%	20%
2	60%	40%
3	80%	60%
4	100%	80%
5	100%	100%

Heat Index المؤشر الحراري		Relative Humidity الرطوبة المرتبطة								
		10%	20%	30%	40%	50%	60%	70%	80%	90%
Air Temp °C درجة الحرارة	>50	**	**	**	**	**	**	**	**	**
	50	48	**	**	**	**	**	**	**	**
	49	47	**	**	**	**	**	**	**	**
	48	45	53**	**	**	**	**	**	**	**
	47	44	51	**	**	**	**	**	**	**
	46	43	49	**	**	**	**	**	**	**
	45	42	47	**	**	**	**	**	**	**
	44	41	46	52**	**	**	**	**	**	**
	43	40	44	49	**	**	**	**	**	**
	42	39	42	47	54**	**	**	**	**	**
	41	38	41	45	51	**	**	**	**	**
	40	37	39	43	48	**	**	**	**	**
	39	36	38	41	46	52**	**	**	**	**
	38	35	37	39	43	49	55**	**	**	**
	37	34	35	38	41	46	51	**	**	**
	36	33	34	36	39	43	48	54**	**	**
	35	32	33	35	37	41	45	50	**	**
	34	31	32	33	35	38	42	47	52**	**
	33	31	31	32	34	36	40	44	48	54**
	32	30	30	31	32	34	37	40	44	49
	31	29	29	30	31	33	35	38	41	45
	30	28	28	29	30	31	33	35	38	41
	29	27	27	28	29	30	31	33	35	37
	28	27	27	27	28	28	29	31	32	34
	27	26	26	26	27	27	28	29	30	31
	26	25	25	26	26	27	27	27	28	28

5.3 Applying the worksite examination models:

Worksite Examination	Yes	No
Are rest seats available, and shaded in workplace?		
Are there posters reminding workers of the importance of drinking water?		
Is there communication means to inform workers of environmental conditions, such as flags?		
Is cold and potable water or other liquids available?		
In the event of availability of drinking water supply, are water containers tightly covered from the top, and is filling date stated on container?		
Are fruits and snacks available for workers during work performance for preservation of nutrients and calories?		
Are there posters reminding workers of injury or disease's symptoms and signs upon exposure to high temperature?		
Are there paramedics at worksite?		
Are emergency medical numbers available?		
Knowledge & Training	**Yes**	**No**
Do workers know injury or disease's symptoms and signs upon exposure to high temperature?		
Is there a trained first aid provider at worksite?		
Does the first aid provider have valid training certificates issued by approved centers?		
Does the first aid provider have a complete first aid kit including tools suitable for worksite hazards?		
Is the first aid provider trained on treatment of cases of injury or disease's symptoms and signs upon exposure to high temperature?		
Does the first aid provider and work supervisor know the method to communicate with and direct medical emergency to worksite?		
Has a virtual scenario been performed in worksite for the process of treatment of cases of exposure to high temperature?		
Is there a mean to contact medical emergency at worksite?		
Worksite Procedures	**Yes**	**No**
Does worksite have environmental conditions and heat stress assessment processes?		
Are meals provided by employer? If yes, Are meals provided to workers appropriate and compatible with worksites of high temperatures?		
Is TBT: toolbox talk applied prior to work commencement?		
Is noon work ban law issued by Ministry of Human Resources and Social Development applied at worksite?		

5.4 Golden rules for preventing from the effects of exposure to sunlight and work in the hot place:

Drinking excessive amounts of fluids, especially water even if you are not thirsty every 15 to 20 minutes.

If you felt fatigue or dizziness, stop working immediately and inform other workers around you

Ask for help and do not carry out the work a lone

Wear light and bright-colored clothes

Try to work in shaded places

Make sure to take breaks in shaded places

6- References

Freedland، L.، 1987. Safety-health and working conditions. Stockholm: Joint Industrial Safety Council.

HSE، 2013. Workplace health، safety and welfare. Sudbury، Suffolk: Health and Safety Executive.

HSE، 2021. HSE - Temperature: Outdoor working. [online] Hse.gov.uk. Available at: <https://www.hse.gov.uk/temperature/outdoor.htm> [Accessed 1 June 2021].

ILO، 2014. Physical Hazards - Heat in the Workplace. [ebook] ILO. Available at: <https://www.ilo.org/caribbean/projects/WCMS_250199/lang--en/index.htm> [Accessed 28 May 2021].

Kjellstrom، T.، Maître، N.، Saget، C.، Otto، M. and Karimova، T.، 2019. Working on a warmer planet: The effect of heat stress on productivity and decent work. [ebook] ILO. Available at: <https://www.ilo.org/global/publications/books/WCMS_711919/lang--en/index.htm> [Accessed 29 May 2021].

Kjellstrom، T.، Otto، M.، Lemke، B.، Hyatt، O.، Briggs، D.، Freyberg، C. and Lines، L.، 2021. Climate Change and Labour: Impacts of Heat in the Workplace. [ebook] UNDP. Available at: <https://www.ilo.org/global/topics/green-jobs/publications/WCMS_476194/lang--en/index.htm> [Accessed 29 May 2021].

McDonald، O.F.، Shanks، N.J. and Fragu، L.، 2008. Heat stress improving safety in the Arabian Gulf oil and gas industry. Professional Safety، 53(08).

OSHA، 2021. Heat. [online] Occupational Safety and Health Administration. Available at: <https://www.osha.gov/heat-exposure> [Accessed 28 May 2021].

OSHA، 2021. Heat Illness Prevention. [online] Occupational Safety and Health Administration. Available at: <https://www.osha.gov/heat/> [Accessed 28 May 2021].

OSHAD، 2016. Safety in the Heat. [online] Oshad.ae. Available at: <https://www.oshad.ae/Lists/OshadSystemDocument/Attachments/123/OSHAD-SF%20-%20TG%20-%20Safety%20in%20the%20Heat%20v3.0%20English.pdf> [Accessed 30 May 2021].

Safe Work Australia، 2021. Managing the risks of working in heat. [ebook] Safe Work Australia. Available at: <https://www.safeworkaustralia.gov.au/doc/guide-managing-risks-working-heat> [Accessed 28 May 2021].

Saudi Red Crescent Authority, 2014, The Guidance in First Aid, Prince Naif for First Aid Principles

Human Resources and Social Development

National Council for Occupational Safety & Health

SaudiNCOSH