TITLE: Heat & Cold Stress Injuries		**STANDARD:**	301
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Definitions (in relation to this Standard)

Heat Injuries	Heat Stress disorders, Heat Exhaustion or Heat Hyperpyrexia (Stroke)
Cold Injuries	Frostbite, Hypothermia or Immersion Foot
Heat Index	Is an index that combines air temperature and relative humidity in an attempt to determine the human-perceived equivalent temperature

Cross-References

- Standard 100 – Guidance for ES&H Program
- Standard 300 – Medical Services & Management
- Standard 302 – Welfare

Standard

General Requirements

1. Contractor's ES&H Program shall contain a dedicated procedure for reducing exposure to heat and cold injuries for work conditions in Saudi Arabia.

2. Ministerial Decree 3337 (dated 15/7/1435 H) - it is prohibited to work under direct sun in open areas from twelve (12) p.m. to three (3) p.m. during the period from the 15th day of June through to the 15th day of September every year. (Subject to change by Ministerial Decision)

3. The following factors shall be considered:

    - Mean temperatures
    - Wind speeds
    - PPE and clothing that must be worn
    - Type of work (especially confined spaces)
    - Nationality of the workforce
    - Health of the workforce
    - Level of heat & cold injury awareness of the workforce

4. Any employees who have symptoms of any heat or cold injury shall seek immediate medical attention from a professional medical service provider.

5. Contractor is to provide awareness training on symptoms and first aid treatment for heat injuries on monthly from April - October. Information can be found at Appendix 1 to this Standard.

6. Contractor is to comply with Standard 302 – Welfare, specifically provision of shade and cooled potable water.

7. It is not envisaged that employees will be exposed to cold injuries due to the environment in Saudi Arabia; however certain work processes do contain the hazards of cold injuries (use of liquid nitrogen, dry-ice blasting etc…). Contractor Medical staff is to be fully aware of symptoms and treatment for all cold injuries.

8. Contractor project nurse will visit the site with complete PPE and medical uniform on daily basis and on time of leave or absence a replacement must be available. All replacement medical staff must be interviewed and approved by the Royal Commission ES&H Department. Fifty (50) workers and above a qualified male nurse is needed and forty nine (49) workers below a qualified first aider is required.

9. Project nurse must conduct/participate in health related training according to the type of work and condition of the workers (heat stress, cold stress, emergency awareness, evacuation drill etc.).

10. During extremely hot and humid weather, Contractor needs to closely monitor the heat index at the **actual work location** and use the Heat Index Chart for guidance. Each contract must have a functional device for measuring relative heat readings**. See appendix 2**

- If Heat index **reaches 54 or greater** (at actual work station or location), task must be stopped immediately
- If Heat Index varies from 39-53, contractor must follow extreme cautions according to heat stress prevention plan. i.e. Risk assessment, work rotation, frequent rest etc. and if necessary stop work immediately.

Rev.	Date	Description	Prep.	Checked	Approved
000	May-2009	Original	MS	WG	HS
001	Oct - 2015	1st Revision	FH	FC	AK

Appendix 1

Hot Climate Considerations

Two major factors affect the body's temperature when working in hot environments:

Metabolic – this is the heat generated by the body functions which increases with the workload.

Environmental – these are the factors leading to heat illnesses – high temperature and humidity, direct sun or heat, limited air movement, physical exertion, poor physical health, taking medicines, lack of knowledge and insufficient water intake.

The body tries to maintain its normal internal temperature of 37 C [98.6 F] to protect the central core containing the vital organs, the heart, kidneys and the brain. The brain cannot survive when its temperature exceeds 44 C [111.2 F]. For the majority of persons this means we are comfortable working in an environment between 13C - 23 C [55 F - 73 F], at 45% humidity.

It has been researched and documented that the risk of accidents increases as temperatures approach 35 C [95 F].

When the blood's temperature rises above 37 C [98.6F] the brain initiates the body's control mechanisms. This results in the heart pumping more blood, the blood vessels expand, the blood circulates closer to the surface of the skin and the excess heat is lost to the air through convection, radiation, conduction and evaporation (sweating).

Convection is the transfer of heat by movement of air next to the skin; the higher the air speed, the greater amount of heat loss by convection. But when air temperature is hotter than the body temperature, the loss of body heat is not possible by this mechanism.

Radiation is the transfer of heat to cooler objects through space. If the surroundings are cooler than the body, the body's heat will transfer to these surroundings, but if the surroundings are hotter than the body, the body will absorb the heat.

Conduction is the transfer of heat between objects that are in contact with each other. The air temperature must be cooler than the skin for this to occur.

Evaporation is the cooling of the body that takes place when sweat evaporates from the skin. Millions of sweat glands are found over the body. Sweat evaporates from the skin cooling the skin surface. Sweating does not cool the body unless the sweat can evaporate from the skin. The drier a climate the more sweat will be evaporated from the body. When the humidity is low, a large amount of evaporation takes place and increased cooling results. In a humid climate evaporation of sweat is difficult since the surrounding air is already saturated with water.

When air temperatures are as warm, or warmer than the skin, evaporation of sweat becomes the only effective way to cool the body.

Sweat consists mainly of water. Lack of water replacement is the major factor in heat illnesses. In normal conditions, the body loses 2 ½ litres of bodily fluids per day; whilst working in hot climates, the body can lose up to 1 ½ litres of sweat per hour.

Therefore persons must drink at least enough water to replace the water that is lost through sweating and normal other losses [respiration, urine and faeces]; ideally fluids should be taken every 20 minutes throughout the day.

HEAT ILLNESS SYMPTOMS & TREATMENT

Sunburn

Symptoms
Reddened skin
Painful to touch
Blistering

Treatment
Calamine, After-sun Lotions

Heat rash [prickly heat]

Symptoms
This occurs because sweat is not easily evaporated from the skin. Sweat ducts become plugged, the sweat glands get inflamed and a rash occurs.
Burning sensation
Rash of tiny red spots

Treatment
Washing regularly with mild drying lotions

Heat cramps

Symptoms
Pain and cramps in the extremities
Nausea

Treatment
Copious fluids with added glucose

Heat exhaustion

Symptoms
Caused by a loss of salt and water from the body usually through excessive sweating
Headache
Dizziness
Loss of appetite
Nausea
Sweating with pale clammy skin
Rapid weakening pulse
Shallow breathing

Treatment
Move to a cool environment; give rapid cooling, tepid sponging, and copious fluids

Heat Hyperpyrexia [heat stroke]

Symptoms
Begins as heat exhaustion but when the body's system for losing heat is over whelmed, the core temperature rises rapidly and tissue damage to vital organs occurs.
Headache
Dizziness
Confusion
Hot flushed and dry skin
Full bounding pulse
Temperature above 40C

Treatment
Medical evacuation