## Document Revision Change Table

| Revision Number | Revision Description | Revised By | Revision Date |
|---|---|---|---|
| New | | | 04/15 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Internal
CONTROLLED DOCUMENT AS OF 9/13/2021 11:10 AM
-- UNCONTROLLED THEREAFTER –

## 1. PURPOSE

This standard provides **information** to minimize employee and contractor overexposure to heat related stress.

## 2. SCOPE

This **information** standard applies to the BASF Beaumont Site.

## 3. DEFINITIONS

**3.1.** **Heat Cramps** – Painful muscle spasms (usually the stomach, side, shoulders, or thigh) that occur during or following intense physical activity in hot environments.

**3.2.** **Heat Exhaustion** – An acute reaction to heat exposure characterized by fatigue, weakness, disorientation, collapse, and profuse sweating. Symptoms may include pale, clammy skin, rapid weak pulse, muscle twitching, headache, nausea, and dizziness. Body temperature is relatively normal (< 102 $^{o}$F), but blood pressure may be decreased.

**3.3.** **Heat Rash** – A mild skin condition caused by sweat duct blockage (usually under clothing) which results in a rash, and may be accompanied by itching or burning.

**3.4.** **Heat Stroke** – An acute life-threatening reaction to heat exposure characterized by extremely high body temperature (> 102 $^{o}$F), altered mental status, and absence of sweating. Symptoms include changes in behavior and thinking, flushed dry skin, hyperventilation, nausea, and vomiting.

**3.5.** **Acclimatization** – Control method used to gradually expose employees to high heat levels. Generally applies to employees returning from vacation or illness, medically impaired, or who are physically unfit.

**3.6.** **Heat Stress and/or Temperature Alert** – System used to notify employees of potential heat stress or temperature hazard conditions.

**3.7.** **Work Load** – May be classified as light, moderate, or heavy work. Most tasks conducted at this site can be classified as moderate work. However, a task that required additional PE (such as a chemical suit) may exert more stress on an employee. In such case, a task with these requirements could be classified as heavy.

**3.7.1** *Light work* – Generally consists of work requiring moderate arm/trunk movement. Examples include inspections, equipment calibrations, light machine work, turning small valves, sampling, etc.

**3.7.2** *Moderate work* – Generally consists of work requiring heavy arm and leg movement or moderate lifting and/or pushing. Examples may include valve and motor repairs, valve alignments, light material handling, walking about with moderate lifting and/or pushing, etc.

## 3. DEFINITIONS CONT'D

**3.7.3** *Heavy work* – Generally consists of intermittent heavy lifting, pushing, or pulling. Examples may include extensive ladder and stair climbing, pick and shovel work, turning large valves, asbestos work, etc.

## 4.0 PROCEDURE

**4.1** All heat related disorders require evaluation by the Site Medical Responders or Site Medical Department for BASF employees.

**4.2** The following risk factors shall be considered when there is potential for employee exposure to high temperatures:

**4.2.1.** **Age -** The aging process results in a more sluggish response of the body's heat control system**.**

**4.2.2.** **Obesity -** It is well established that obesity increases the probability for heat related disorders. The additional weight requires additional energy to perform a given task. The insulating effect of excess fat decreases natural heat dissipation**.**

**4.2.3.** **Personal Protective Equipment -** Use of PPE that does not breathe increases heat stress potential by blocking the evaporative cooling effect of sweat.

**4.2.4.** **Strenuous Work Levels -** High muscle activity increases metabolism (heat) and increases muscle blood flow. Increased muscle blood flow decreases blood flow to the skin. The body sheds heat by flowing blood to the skin where heat can escape from the blood into the air.

**4.2.5.** **Dehydration/Electrolytic Imbalance -** The body relies on proper fluid/water level to provide necessary quantities of sweat. Proper body fluid levels (through water intake) are necessary for nerve conduction.

**4.2.6.** **Lack of Acclimatization -** Proper acclimatization leads to more efficient sweating (less salt is lost, sweating starts earlier, sweat volume increases) and better cooling.

**4.2.7.** **Alcohol -** Alcohol use slows the body's heat control system, and decreases body fluid level.

**4.2.8.** **Diseases/Conditions -** The following diseases/conditions may make an individual more susceptible to heat related illness:

1. Cardiovascular disease
2. Kidney disease
3. Hyperthyroidism



CONTROLLED DOCUMENT- 24 HRS FROM 9/13/2021 11:10 AM
-- UNCONTROLLED THEREAFTER –

## 4.0 PROCEDURE CONT'D.

4. Diabetes mellitus
5. Parkinson's disease
6. Skin conditions which limit sweating, including sunburn
7. Malnutrition
8. Poor Physical condition

**4.2.9.** **Medications** - The following medication may make an individual more susceptible to heat related illness:

1. Antispasmodics (Anti-spasm)
2. Tricyclic antidepressants
3. Psychotropics (phenothiazines)
4. Antihistamines
5. Diuretics
6. β-adrenergenic receptor blocking agents
7. Calcium channel blocking agents
8. Stimulants

**4.3 The following preventive measures shall be considered when there is potential for employee exposure to high temperatures:**

**4.3.1.** **Engineering controls:**

- General ventilation can be used to dilute hot air with cooler air (cooler air that is brought in from the outside, or air conditioned air). A permanently installed ventilation system usually handles large areas or entire buildings. Portable or local ventilation systems may be more effective or practical in smaller areas.
- Another way to reduce heat stress is to increase the air flow using fans, or air blowers in the work area. Changes in air speed can help employees stay cooler by increasing the rate of sweat evaporation.
- However, if the air temperature is higher than 98 degrees F the hot air passing over the skin can actually make the employee hotter. Also, increases in air speed have no effect on the body temperature of employees wearing PPE that does not breathe (e.g., impervious chemical resistant slicker suits).
- Shields and/or insulation can be used to reduce radiant heat (i.e., heat coming from hot surfaces within the employee's line of sight). Surfaces that exceed 95 degrees F are sources of radiant heat that can add to the employee's heat load.
- Cooler surfaces surrounding the employee assist in cooling because the employee's body radiates heat toward them.

**4.3.2.** **Acclimatization**

The human body can adapt to heat exposure to some extent. After a period of acclimatization, the same activity will produce fewer cardiovascular demands. The


CONTROLLED DOCUMENT - 24 HRS FROM 9/13/2021 11:10 AM
-- UNCONTROLLED THEREAFTER –

## 4.0 PROCEDURE CONT'D.

employee 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 involves exposing employees to work in a hot environment for short periods to begin with, then gradually increasing the exposure time over a two to three week period.

### 4.3.3. Hydration

Cool (50-60 degrees F) water or any cool liquid should be made available to employees. They should be encouraged to drink small amounts frequently, e.g., one cup every 20 minutes. Ample supplies of liquids should be placed close to the work area. Although some commercial replacement drinks contain salt, this is not necessary for acclimatized individuals because the average American's diet provides adequate salt intake.

**Field cool down stations should be established on June 1 of each year, or when Impact Weather Heat Index alerts begin, whichever is earlier.**

### 4.3.4. Salt tablets

The use of salt tablets is not recommended. The average American's diet provides adequate salt intake.

### 4.3.5. Heat Stress Alert System

The Heat Stress and Temperature Alert System will be used to alert employees of environmental conditions that may potentially present heat stress hazards.

StormGeo, Inc. will notify the Site when the Heat Index (HI) alert point is forecasted by sending the site and email at 8am in the morning of the forecast. Once Security receives the email they will then make an advisory "all call" over the PA system and Radio with the alert information **(See ATTACHMENT C)**

**Alerts are as follows:**

- The Heat Index is expected to be greater than or equal to $105^0$F,
- The forecasted low temperature is greater than or equal to $80^0$F, or
- The ambient temperature is expected to be greater than or equal to $100^0$F

Additionally the following administrative controls can also be used to reduce heat stress:

- Reduce the physical demands of work, e.g., excessive lifting or digging with heavy objects.
- Use modified schedules, e.g., early morning, cool part of the day, or night work. Note, highest heat index is typically late afternoon.
- Use intermittent rest periods in cool areas, with water breaks.



CONTROLLED DOCUMENT - 24 HRS FROM 9/13/2021 11:10 AM
-- UNCONTROLLED THEREAFTER –

## 4.0 PROCEDURE CONT'D.

- Use relief employees.
- Use employee pacing.
- Use portable chillers with air hoses to move cool air to work space.
- Use of work/rest period schedules.(See Example- ATTACHMENT A.)

### 4.3.6. Personal Protective Devices

Commercially available ice vests, though heavy, may accommodate as many as 72 ice packets, which are usually filled with water. The cooling offered by ice packets lasts only 2 to 4 hours at moderate to heavy heat loads, and frequent replacement is necessary. Cooling with ice is also relatively inexpensive.

## 5.0 RESPONSIBILITIES

**5.1** It is the responsibility of all contractors to develop and implement a heat stress protection program that adequately protects contractors from heat related disorders.

**5.2** It is the responsibility of the Site Leadership Team (SLT) to ensure compliance with this standard.


CONTROLLED DOCUMENT- 24 HRS FROM 9/13/2021 11:10 AM
-- UNCONTROLLED THEREAFTER –
Internal

# ATTACHMENT A

## Guide: Work Period / Rest Period Schedule

| Work Load with Regular Work Clothes for Acclimatized Workers (Temperature in °F) | | | Work/Rest Regimen in Each Hour | |
|---|---|---|---|---|
| **Light** | **Moderate** | **Heavy** | **Work** | **Rest** |
| 95 | 90 | 85 | Continuous | N/A |
| 100 | 95 | 90 | 75% | 25% |
| 105 | 100 | 95 | 50% | 50% |
| 110 | 105 | 100 | 25% | 75% |

| Work Load with PPE for Acclimatized Workers (Temperature in °F) | | | Work/Rest Regimen in Each Hour | |
|---|---|---|---|---|
| **Light** | **Moderate** | **Heavy** | **Work** | **Rest** |
| 85 | 80 | 75 | Continuous | N/A |
| 90 | 85 | 80 | 75% | 25% |
| 95 | 90 | 85 | 50% | 50% |
| 100 | 95 | 90 | 25% | 75% |

The above working times are an example of guidelines for **acclimated** employees. They need to be reduced further for employees at higher risk (see Section 4.2).

Work must stop if the signs/symptoms of heat stress are observed or experienced by any employee. Signs/symptoms include muscle spasms, fatigue, weakness, disorientation, collapse, and profuse sweating. Symptoms may include pale, clammy skin, rapid weak pulse, muscle twitching, headache, nausea, and dizziness. Blood pressure may be decreased.

In severe cases, heat stroke (a life threatening condition) can occur and symptoms are extremely high body temperature (> 102 $^{o}$F), altered mental status, and absence of sweating. Symptoms also include changes in behavior and thinking, flushed dry skin, hyperventilation, nausea, and vomiting.

CONTROLLED DOCUMENT- 24 HRS FROM 9/13/2021 11:10 AM
-- UNCONTROLLED THEREAFTER –
Internal

# ATTACHMENT B

| Category | Ambient Temp ( °F) wearing regular clothing[1] | Ambient Temp ( °F) wearing PPE[2] | Action Steps |
|---|---|---|---|
| I | <90 | <70 | • No specific heat stress action steps. |
| II | 90-100 | 70-90 | • Ready access to fluids, consumption should be 1 cup every 20 minutes[3].<br>• Periodic breaks.<br>• Monitor employees for symptoms by supervision. |
| III | 100-110 | 90-100 | • All Category II, plus a communicated work/rest regimen and at least one of:<br>- Use shading<br>- Use temporary insulation<br>- Use spot cooling (fan or A/C)<br>- Use personal cooling devices (cooling vests, vortex tubes, etc.)<br>- Supplied air respiratory protection.<br>- Reflective barriers for radiant heat. |
| IV | 110-120 | 100-110 | • All Category II, plus a documented work/rest regimen; at least one of Category III, plus:<br>- No work[4] without approval from next level of supervision. |

1 - Regular clothes- long Sleves.

2 - PPE- slicker suits (e.g.- for acids or caustics, impermeable coveralls (e.g.- for asbestos, lead), disposable coveralls, welding leathers, etc.

3 - For certain activities involving decontamination (asbestos, lead) where access to water may be infeasible, a special work/rest regimen must be developed.

4 - Work means continuous presence in the environment for greater than 15 minutes.

CONTROLLED DOCUMENT- 24 HRS FROM 9/13/2021 11:10 AM
-- UNCONTROLLED THEREAFTER –

**ATTACHMENT C**

# HEAT INDEX (HI) ALERTS

**Radio ALL CALL and BMNT PA Announcements**

**→ ATTENTION, I REPEAT ATTENTION**

**This is a Heat Index Alert ……Please use caution in carrying out work activities. Adjust work and rest schedules as needed.**

**CONTACT YOUR SUPERVISOR IF YOU HAVE ANY QUESTIONS**

**I Repeat, this is a Heat Index Alert …….. Repeat Above (twice)→**

**After second announcement say the below:**
**This concludes the announcement**
**PLEASE MAKE A SAFE DAY**



CONTROLLED DOCUMENT- 24 HRS FROM 9/13/2021 11:10 AM
-- UNCONTROLLED THEREAFTER –