



Heat Safety Program

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1 PURPOSE

The purpose of this program is to provide guidance for worker safety related to heat illness and while conducting work in hot environments. This program provides requirements to:

- Ensure adequate communication and controls are in place before work in a hot environment begins
- Assist in identifying and eliminating potential hazards during hot conditions
- Ensure that workers are protected from heat illness while working in hot conditions

2 SCOPE

This program applies to all Mosaic North America Business operations facilities and covers all employees and contractors performing work on Mosaic property.

3 APPENDICES

The following appendices are associated with this Program:

Appendix	Appendix Title
A	Heat Preparedness Checklist
B	Acclimatization Guide
C	Saskatchewan Work/Rest Guidelines
D	U.S. Sites - OSHA-NIOSH Heat Safety Tool Tutorial

4 GENERAL REQUIREMENTS

4.1 Risk Factors

- 4.1.1 Each facility is responsible for having a process in place to identify and manage the risks associated with heat related illness or injury.
- 4.1.2 Prior to conducting work in a hot environment (indoors, outdoors, or underground), the following heat illness risk factors shall be assessed for mitigation:
 - In the United States – Heat index in the Moderate range (light orange)



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(reference the OSHA Heat Index chart below (<https://www.osha.gov/heat/heat-index> and the APP)

Heat Index	Risk Level	Protective Measures
Less than 91°F	Lower (Caution)	Basic Heat Safety and Planning
91°F to 103°F	Moderate	Implement precautions and heighten awareness
103°F to 115°F	High	Additional precautions to protect workers
Greater than 115°F	Very High to Extreme	Triggers even more aggressive protective measures

- In Saskatchewan – a Wet Bulb Globe Temperature (WBGT) of 27.5°C or above
- Work on or near heat generating sources such as steam traps, sulfur guns, burners, dryers, etc.
- Work within a confined space
- Strenuous physical activity
- Heavy or non-breathable work clothes and additional PPE
- Limited air movement
- Direct sun exposure

4.2 Risk mitigation

4.2.1 When one or more of the risk factors listed in 4.1.2 are present, then one or both of the following mitigation measures shall take place:

- Include heat illness as a risk/hazard on the Field Level Hazard Assessment (FLHA) or contractor equivalent and identify control measures, and/or
- Include heat illness control measures on the Safe Work or Confined Space Permit

4.2.2 Any worker suspected heat illness shall be evaluated by ERT, the site nurse, medic or other medical staff.

4.3 Control Measures

4.3.1 Workers shall implement applicable control measures to reduce or eliminate the risk of heat illness. The following list of recommendations can be used to assist in choosing controls that are applicable to the work tasks and environment where work in hot conditions is taking place:

- Complete heavy work during the cooler part of the day.
- Alternate heavy exertion tasks between workers.
- Use fans to increase air flow when possible.



Note: *If the air temperature is at or above body temperature, fans are not an effective method of cooling and can increase heat load.*

- Provide shade for workers if possible (example - use a pop-up tent or tarp).
- Provide a designated rest area(s) that is air conditioned or in the shade.
- Use the buddy system - have workers monitor each other for symptoms.
- Have workers remove any additional PPE during breaks for greatest cooling.
- Ensure easy access to water at the work site.



Note: *As a general guideline, workers should drink approx. 1 cup of water every 15-20 minutes. The amount of water required will vary based on the worker's size, the intensity of the work and heat, and the fitness of the worker.*


- Continue to drink water after work hours to help the body recover.
- Avoid drinks with high caffeine or sugar.
- Schedule break times if necessary.
- Use the Heat Preparedness Checklist in Appendix A as a guide or supplement when completing a Field Level Hazard Assessment (FLHA) or when filling out a permit to verify the work group is prepared for the heat.

5 ACCLIMATIZING NEW WORKERS, TEMPORARY WORKERS, OR WORKERS RETURNING FROM EXTENDED ABSENCE


5.1 Sites shall be responsible for developing a heat acclimatization plan for workers that:

- Are new, temporary, or returning to work after a period off work of 4 weeks or more, and
- Will be exposed to any of the heat illness risk factors listed in Section 4.1.

5.2 Acclimatization plans for the workers described in 5.1 shall be developed specifically for the work and area they will be working in.

 **Note:** Refer to the *Acclimatization Guide in Appendix B* for acclimatization measure recommendations and a sample acclimatization plan.

- 5.3 Sites should refer to local, state, provincial, and federal guidelines that address acclimatizing workers.

 **Information:** Heat acclimatization for a worker is the improvement in their body's heat tolerance that comes from gradually increasing the intensity or duration of physical work performed in a hot environment.
New workers have the highest risk for heat illness. It is crucial that new workers be acclimatized to a hot work environment.

6 HEAT SAFETY TOOLS / GUIDELINES FOR WORKING IN HOT CONDITIONS

6.1 Saskatchewan Sites

6.1.1 WorkSafe Saskatchewan's *Working Under Hot Conditions* provides information on how to control hot conditions and prevent heat stress disorders.

- Wet Bulb Globe Temperature (WBGT) measurements are used as the primary means of determining rest break schedules when working in hot conditions indoors, outdoors, and underground. The WBGT Index Rest Break Schedule, which incorporates the work load and work rate according to WBGT measurement, can be found in Appendix C.
- When WBGT measurements are not available, the rest break guideline according to humidex can also be used (see Appendix C).

 **Note:** *Environment Canada reports humidex values and issues weather advisories for hazardous heat conditions.*

6.2 United States Sites

6.2.1 OSHA-NIOSH Heat Safety Tool

- It is highly recommended that the OSHA-NIOSH Heat Safety Tool Application (available on the Apple App Store) be downloaded to mobile smart devices for use in determining work environmental conditions.
- Appendix D, OSHA-NIOSH Heat Safety Tool, provides details on the use of the application tool.

6.2.2 United States National Weather Service Advisories



- The National Weather Service is a part of the National Oceanic and Atmospheric Administration (NOAA) branch of the Department of Commerce.
- NOAA's heat alert procedures are based mainly on Heat Index Values. The Heat Index, sometimes referred to as the apparent temperature, is given in degrees Fahrenheit. The Heat Index is a measure of how hot it really feels when relative humidity is factored in with the actual air temperature.
- Table 1 below depicts the NOAA Heat alerts available and what actions can be taken when received.

Table 1 – NOAA Heat Alerts	
Warning Given	Actions to take
<u>Excessive Heat Warning</u> – Issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule for this warning is when the maximum heat index temperature is expected to be 105°F (over 46°C) or higher for at least 2 days and night time temperatures will not drop below 75°F/24°C.	<ol style="list-style-type: none">1. Reschedule non-essential work for days when heat index is lower.2. Tasks that require heavy or non-breathable clothing/chemical impervious PPE should be minimized as much as possible. If these tasks must be conducted, designate a knowledgeable person to be on-site to monitor conditions and modify work activities as needed.3. Have adequate amounts of drinking water in convenient, visible locations close to work area.4. Set a clear drinking schedule and actively encourage workers to drink water often.5. For prolonged sweating lasting more than several hours, drink sports drinks.6. Establish and enforce a work/rest schedule. (Note: rest can be light work, like sorting parts, attending a safety meeting, etc. in a shaded area).7. Schedule breaks in a cool, shaded area.8. Have workers remove PPE while resting.9. Increase rest time as heat index rises.10. Set up shade canopies over work area if possible.11. Decrease pace of strenuous work tasks.



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	<ol style="list-style-type: none">12. Rotate workers to tasks not requiring PPE for part of shift.13. Know what to do in case of an emergency.14. Know where you are in case you need to call for help.
<p><u>Heat Advisory</u> –</p> <p>Issued within 12 hours of the onset of extremely dangerous heat conditions. An advisory is issued when the maximum heat index temperature is expected to be 100° F (40°C) or higher for at least 2 days and night time temperatures will not drop below 75°F/24°C.</p>	<ol style="list-style-type: none">1. Plan strenuous activities for early in the day.2. Have adequate amounts of drinking water in convenient, visible locations close to work area.3. Drink plenty of water even if not thirsty.4. For prolonged sweating lasting more than several hours, drink sports drinks.5. Take breaks in a cool, shaded area.6. Have workers remove PPE while resting.7. Increase rest time as heat index rises.8. Set up shade canopies over work area if possible.9. Decrease pace of strenuous work tasks.10. Rotate workers to tasks not requiring PPE for part of shift.11. Know what to do in case of an emergency.
<p><u>Excessive Heat Outlook</u> –</p> <p>Issued when the potential exists for an excessive heat event in the next 3- days.</p> <p style="text-align: center;">OR</p> <p><u>Excessive Heat Watch</u> –</p> <p>Issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. A watch is used when the risk of a heat wave has increased but the timing is still uncertain.</p>	<ol style="list-style-type: none">1. These give the opportunity to plan work over the next few days.<ul style="list-style-type: none">• Plan strenuous activities for early in the day.• Develop a list of hot weather supplies.• Develop acclimatization schedule for new workers.• Plan work/rest schedules if necessary.• Develop an emergency plan

7 HEAT RELATED ILLNESS SIGNS, SYMPTOMS AND FIRST AID

- 7.1 There are several heat-related illnesses that can affect workers. Some of the symptoms are non-specific; therefore, any unusual symptom can be a sign of overheating when a worker is performing physical labor in a warm environment.
- 7.2 Heat illnesses range from Heat Rash (the least critical) to Heat Stroke (the most dangerous). The temperatures workers are exposed to do not have to be extremely hot to cause heat illness, including heat stroke.
- 7.3 Table 2 below provides a description of the different heat illnesses, their associated symptoms and signs, as well as the First Aid steps to be taken.

Table 2 - Signs, Symptoms and First Aid actions		
Heat-Related Illness	Symptoms and Signs	First Aid
Heat stroke (Life Threatening)	<ul style="list-style-type: none"> Confusion Slurred speech Unconsciousness Seizures Heavy sweating or hot, dry skin Very high body temperature Rapid heart rate 	<ul style="list-style-type: none"> Call 911 and activate ERT Move person to shaded or air-conditioned area Remove outer clothing Immerse person in cold water or place cold, wet towels over body Apply ice packs to head, neck, armpits & groin Fan air around person
Heat exhaustion	<ul style="list-style-type: none"> Fatigue Irritability Thirst Nausea or vomiting Dizziness or lightheadedness Heavy sweating Elevated body temperature or fast heart rate 	<ul style="list-style-type: none"> Take to on-site clinic or call ERT Move person to a cool area Remove unnecessary clothing and fan person Give water or other cool, non-alcoholic beverage (if not vomiting) Cool by applying cold packs or cool cloths to head, face and neck Do not let worker return to work for remainder of day
Heat cramps	<ul style="list-style-type: none"> Muscle spasms or pain 	<ul style="list-style-type: none"> Move person to shady/cool area



	<ul style="list-style-type: none">▪ Usually in legs, arms, or trunk	<ul style="list-style-type: none">▪ Give water to sip and a sport drink or snack every 15-20 minutes▪ Wait a few hours before allowing them to return to strenuous work
Heat rash	<ul style="list-style-type: none">▪ Clusters of red bumps on skin▪ Often appears on neck, upper chest, and skin folds	<ul style="list-style-type: none">▪ Move worker to cooler, less humid environment▪ Keep affected area dry▪ Apply powder, if worker chooses▪ Do not use ointment or creams
Reference: OSHA Safety & Health Topics/Heat		

7.4 Personal Risk Factors

7.4.1 All employees should be aware that the following list of personal risk factors may cause a person to experience symptoms of heat illness sooner than others:

- Pregnancy
- Obesity
- Diabetes
- High blood pressure
- Heart disease
- Lower level of physical fitness
- Use of certain medications
- Low fluid consumption
- Alcohol use
- Previous heat-related illness

8 PERSONAL PROTECTIVE EQUIPMENT (PPE)

8.1 There are no specific PPE requirements for this program.

9 TRAINING

9.1 Table 3 outlines the training required for the Heat Safety Program:

Table 3 – Training Requirements			
Audience	Training Elements / Topics	Frequency	Method
All employees involved in performing, authorizing, or supervising Work in any Mosaic facility	<ul style="list-style-type: none"> Understanding Heat Illnesses Knowing the signs and symptoms of Heat Illness Identifying risk factors for heat illness Controls to manage Heat Illness 	Initial and Annually	Instructor Led Training (ILT) Or Computer Based Training (CBT)

9.2 Retraining

9.2.1 In addition, an employee shall receive additional training (or retraining) if any of the following conditions exist:

- Program requirements change;
- Changes in the workplace render previous training obsolete;
- Inadequacies in the employee's knowledge is of concern


9.3 Training records

9.3.1 Training records shall be maintained as per ***Mosaic Document and Record Control*** policy.

 **Reference:** *Mosaic Document and Record Control policy*

10 SELF-ASSESSMENTS

10.1 Site self-assessments shall be conducted in accordance with the MMS requirements.

 **Note:** *Recommend any changes to the Program EHS Project Management Office (PMO) via the PMO Change Request form ([Program Change Request Form Link](#))*

11 PROGRAM REVIEW

11.1 The North America Health and Safety team will review this program every 7 years and update as required.



12 RECORD RETENTION

- 12.1 Refer to the *Mosaic Document and Record Control* policy for record retention requirements.

13 DEFINITIONS

- 13.1 Key terms used in this program are defined below.

Term	Definition
Acclimatization	To adapt someone to a new temperature, altitude, climate, environment, or situation.
Confined Space	Any space that has limited or restricted access, is enterable with the whole body, and is not designed for continuous human occupancy. All three items must exist to be considered a confined space. Examples include, but are not limited to: storage tanks, covered rail cars, tank cars and trucks, reactors, dryers, kilns, granulators, receivers, process vessels, bins, silos, hoppers, boilers, manholes, pipelines, dragline tub compartments, etc.
Heat Cramp	A condition that is marked by sudden development of cramps in skeletal muscles and that results from prolonged work or exercise in high temperatures accompanied by profuse perspiration with loss of sodium chloride from the body.
Heat Exhaustion	A condition marked by weakness, nausea, dizziness, and profuse sweating that results from physical exertion in a hot environment. Usually characterized by elevation of core body temperature above 100.4°F (38°C).
Heat Rash	A condition that happens when sweat gets trapped under the skin, blocking the pores.
Heat Stroke	A life-threatening condition marked especially by cessation of sweating, extremely high body temperature (106°F/41.1°C) and collapse that results from prolonged exposure to high temperature.



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Heat Syncope	A condition marked by loss of consciousness resulting from insufficient blood flow to the brain induced by heat exposure.
Humidex	A calculated value that describes the combined effect of humidity and temperature on the human perception of how hot it feels.
Relative Humidity	The ratio of the amount of water vapor actually present in the air to the greatest amount possible at the same temperature
Safe Work Permit	A permit utilized to identify and eliminate potential hazards during job preparation, and to authorize the work.
Wet Bulb Globe Temperature (WBGT)	A measurement that combines air temperature, humidity, air flow, and radiant heat to measure the risk of heat stress disorders. The WBGT approximates the body's physiological responses to hot environments.


14 ROLES and RESPONSIBILITIES

14.1 The following table contains a listing of responsibilities for specific groups/jobs as required by this program.

Group or Title	Responsibilities
General Manager	<ul style="list-style-type: none">• Ensure compliance with the program requirements at their facility
Area Managers / Superintendents	<ul style="list-style-type: none">• Ensure compliance with applicable program requirements• Ensure employees comply with program requirements
Site EHS	<ul style="list-style-type: none">• Support program at site level• Provide subject matter expertise and support of the implementation of the program at facility level



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	<ul style="list-style-type: none">• Work with Supervision as needed to address heat illness controls
Supervisor or designee  Information: Designee is Step-up Supervisor or Management representative	<ul style="list-style-type: none">• Develop acclimatization plan when required by the program and, if needed, consult site medical staff• Determine heat controls with work group prior to job
All Employees	<ul style="list-style-type: none">• Be familiar and comply with program requirements• Complete training requirements• Understand the signs and symptoms of heat illness• Know what to do in a heat illness emergency

15 REFERENCES

References (Number and title)
OSHA 29 CFR 1910 5(a)(1) - General Duty Clause
The Occupational Health & Safety Regulations, 2020 (Saskatchewan), Section 6-7 – Thermal Conditions
OSHA Technical Manual, Section III: Chapter 4
WorkSafe Saskatchewan - Working Under Hot Conditions - https://www.worksafesask.ca/wp-content/uploads/2023/06/23-08_CR8992_PRV_HotConditionsGuideines_FINAL.pdf
OSHA Fact Sheet: Protecting Workers from the Effects of Heat - https://www.osha.gov/sites/default/files/publications/osha3743.pdf
OSHA-NIOSH HEAT TOOL
National Weather Service – www.weather.gov/safety/heat-ww
NIOSH Info Sheet Number 2011-174
NIOSH Publication No. 2016-106 (February 2016)
Dept. of the Army Technical Bulletin TB MED 507/AFPAM 48-152(10)
Mosaic Document and Record Control Policy



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16 REVISION LOG

Rev. No.	Rev. Date	Revised By	Reason for Revision
0	04/12/2021	Eileen Nutt	Initial release
1	5/15/2024	PMO	Scheduled Review