Outdoor Heat Exposure – June 2021

Considerations

The National Weather Service has issued an Excessive Heat Watch for Western Washington from 25 June 2021 at 1400 until 28 June 2021 at 0900. Dangerously hot conditions with afternoon highs in the 90s to near 100 are possible Saturday, Sunday, and Monday. Unusually hot weather over much of Western Washington will significantly increase the potential for heat related illnesses, particularly for those working or participating in outdoor activities.

Ambient temperature inside fuel cells and other enclosed areas can be much higher than outdoors (around 120°F). Chemsplash coveralls are required for use in wet fuel cells, but are not breathable and may increase the potential for heat related illness for the wearer. Take this into consideration prior to planning work.

Per D6-22675.1, Section 5.3, if the fuel temperature is greater than 100°F, the stall is automatically a red stall. Additionally, if the fuel flashpoint is less than 100°F, the stall is automatically a red stall. All Boeing fuel is flashpoint tested and verified above 100°F prior to being accepted at the fuel farm. Aircraft that have been fueled at a non-Boeing site by non-Boeing equipment cannot have their flashpoint verified without further testing.

If a red stall condition exists, the air conditioning carts cannot be used in the stall because they are not rated for hazardous environments.

References

WAC 296-62-095 (Attached)
EHS Communiqué ST086, Heat Exposure – Beat the Heat (Attached)
Everett EHS Outdoor Heat Exposure (Attached)

Training

TR012276: Heat & Sun Related Illness

In Case of Emergency

If an employee shows signs or symptoms of a heat related illness, they must be relieved from duty and provided with a means of reducing body temperature such as removing clothing, drinking water, and/or going into the shade or indoors. If an employee is showing symptoms of heat stroke such as not sweating, loss of consciousness, or disorientation; this is a medical emergency. Call 2-2222 or (206) 622-2222.

Management must supply drinking water at the rate of at least 32 ounces per employee per hour at all times while under high temperature conditions (above 89°).

EHS Contacts

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WAC 296-62-095 Outdoor heat exposure.

WAC 296-62-09510 Scope and purpose.

(1) WAC 296-62-095 through 296-62-09560 applies to all employers with employees performing work in an outdoor environment.

(2) The requirements of WAC 296-62-095 through 296-62-09560 apply to outdoor work environments from May 1 through September 30, annually, only when employees are exposed to outdoor heat at or above an applicable temperature listed in Table 1.

To determine which temperature applies to each worksite, select the temperature associated with the general type of clothing or personal protective equipment (PPE) each employee is required to wear.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Outdoor Temperature Action Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>All other clothing</td>
<td>89°</td>
</tr>
<tr>
<td>Double-layer woven clothes including coveralls, jackets and sweatshirts</td>
<td>77°</td>
</tr>
<tr>
<td>Nonbreathing clothes including vapor barrier clothing or PPE such as chemical resistant suits</td>
<td>52°</td>
</tr>
</tbody>
</table>

Note: There is no requirement to maintain temperature records. The temperatures in Table 1 were developed based on Washington state data and are not applicable to other states.

(3) WAC 296-62-095 through 296-62-09560 does not apply to incidental exposure which exists when an employee is not required to perform a work activity outdoors for more than fifteen minutes in any sixty-minute period. This exception may be applied every hour during the work shift.

(4) WAC 296-62-095 through 296-62-09560 supplement all industry-specific standards with related requirements. Where the requirements under these sections provide more specific or greater protection than the industry-specific standards, the employer must comply with the requirements under these sections. Additional related requirements are found in chapter 296-305 WAC, Safety standards for firefighters and chapter 296-307 WAC, Safety standards for agriculture.
**WAC 296-62-09520 Definitions.**

**Acclimatization.** The body's temporary adaptation to work in heat that occurs as a person is exposed to it over time.

**Double-layer woven clothing.** Clothing worn in two layers allowing air to reach the skin. For example, coveralls worn on top of regular work clothes.

**Drinking water.** Potable water that is suitable to drink. Drinking water packaged as a consumer product and electrolyte-replenishing beverages (i.e., sports drinks) that do not contain caffeine are acceptable.

**Engineering controls.** The use of devices to reduce exposure and aid cooling (i.e., air conditioning).

**Environmental factors for heat-related illness.** Working conditions that increase susceptibility for heat-related illness such as air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload (i.e., heavy, medium, or low) and duration, and personal protective equipment worn by employees. Measurement of environmental factors is not required by WAC 296-62-095.

**Heat-related illness.** A medical condition resulting from the body's inability to cope with a particular heat load, and includes, but is not limited to, heat cramps, heat rash, heat exhaustion, fainting, and heat stroke.

**Outdoor environment.** An environment where work activities are conducted outside. Work environments such as inside vehicle cabs, sheds, and tents or other structures may be considered an outdoor environment if the environmental factors affecting temperature are not managed by engineering controls. Construction activity is considered to be work in an indoor environment when performed inside a structure after the outside walls and roof are erected.

**Vapor barrier clothing.** Clothing that significantly inhibits or completely prevents sweat produced by the body from evaporating into the outside air. Such clothing includes encapsulating suits, various forms of chemical resistant suits used for PPE, and other forms of nonbreathing clothing.

**WAC 296-62-09530 Employer and employee responsibility.**

(1) Employers of employees exposed at or above temperatures listed in WAC 296-62-09510(2) Table 1 must:
   (a) Address their outdoor heat exposure safety program in their written accident prevention program (APP); and
   (b) Encourage employees to frequently consume water or other acceptable beverages to ensure hydration.

(2) Employees are responsible for monitoring their own personal factors for heat-related illness including consumption of water or other acceptable beverages to ensure hydration.
WAC 296-62-09540 Drinking water.

(1) Keeping workers hydrated in a hot outdoor environment requires that more water be provided than at other times of the year. Federal OSHA and research indicate that employers should be prepared to supply at least one quart of drinking water per employee per hour. When employee exposure is at or above an applicable temperature listed in WAC 296-62-09510(2) Table 1:

(a) Employers must ensure that a sufficient quantity of drinking water is readily accessible to employees at all times; and

(b) Employers must ensure that all employees have the opportunity to drink at least one quart of drinking water per hour.

(2) Employers are not required to supply the entire quantity of drinking water needed to be supplied for all employees on a full shift at the beginning of the shift. Employers may begin the shift with smaller quantities of drinking water if effective procedures are established for replenishment during the shift.

WAC 296-62-09550 Responding to signs and symptoms of heat-related illness.

(1) Employees showing signs or demonstrating symptoms of heat-related illness must be relieved from duty and provided with a sufficient means to reduce body temperature.

(2) Employees showing signs or demonstrating symptoms of heat-related illness must be monitored to determine whether medical attention is necessary.

WAC 296-62-09560 Information and training.

All training must be provided to employees and supervisors, in a language the employee or supervisor understands, prior to outdoor work which exceeds a temperature listed in WAC 296-62-09510(2) Table 1, and at least annually thereafter.

(1) Employee training. Training on the following topics must be provided to all employees who may be exposed to outdoor heat at or above the temperatures listed in WAC 296-62-09510(2) Table 1:

(a) The environmental factors that contribute to the risk of heat-related illness;

(b) General awareness of personal factors that may increase susceptibility to heat-related illness including, but not limited to, an individual's age, degree of acclimatization, medical conditions, drinking water consumption, alcohol use, caffeine use, nicotine use, and use of medications that affect the body's responses to heat. This information is for the employee's personal use;

(c) The importance of removing heat-retaining personal protective equipment such as nonbreathable chemical resistant clothing during all breaks;

(d) The importance of frequent consumption of small quantities of drinking water or other acceptable beverages;
(e) The importance of acclimatization;

(f) The different types of heat-related illness, the common signs and symptoms of heat-related illness; and

(g) The importance of immediately reporting signs or symptoms of heat-related illness in either themselves or in co-workers to the person in charge and the procedures the employee must follow including appropriate emergency response procedures.

(2) Supervisor training. Prior to supervising employees working in outdoor environments with heat exposure at or above the temperature levels listed in WAC 296-62-09510(2) Table 1, supervisors must have training on the following topics:

(a) The information required to be provided to employees listed in subsection (1) of this section;

(b) The procedures the supervisor must follow to implement the applicable provisions of WAC 296-62-095 through 296-62-09560;

(c) The procedures the supervisor must follow if an employee exhibits signs or symptoms consistent with possible heat-related illness, including appropriate emergency response procedures; and

(d) Procedures for moving or transporting an employee(s) to a place where the employee(s) can be reached by an emergency medical service provider, if necessary.
Heat Exposure – Beat the Heat

The human body typically gains heat when the air temperature is higher than the skin temperature, from radiant heat such as sunlight and from metabolic heat produced while working or exercising.

The body normally loses heat by evaporating perspiration and convection cooling if the air temperature is less than 90 degrees and humidity is not high. Workers are at risk of heat illness when the body cannot cool itself as quickly as heat is being generated.

**Environmental Risk factors for heat illnesses include:**
- High temperatures (above 90 degrees F)
- High humidity
- Direct sunlight
- Low air movement

**Individual Risk factors for heat illnesses include:**
- Heavy exertion or workload
- Inadequate acclimatization
- Poor physical conditioning or poor health
- Particular types of medications (consult your doctor or pharmacist)


**Heat Exhaustion** is a serious condition that can lead to heat stroke if not treated. Symptoms of heat exhaustion may include headache, dizziness, lightheadedness, fainting, weakness, moist skin and muscle cramps. Heat exhaustion is on a continuum that may lead to heat stroke, if left untreated.

**Heat Stroke** is a very serious condition which may be fatal if not treated promptly. Symptoms of heat stroke may include hot skin, redness, confusion, disorientation, loss of consciousness, seizures or fits.

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### Prevent Heat Illness:
- Know the signs/symptoms of heat-related illnesses and check yourself and coworkers.
- Avoid direct sunlight.
- Take regular cool-down breaks.
- Use cooling fans.
- Drink lots of water; about 1 cup every 15 minutes.
- Avoid caffeinated beverages, they cause dehydration.
- Wear lightweight, light colored, loose-fitting clothes.

### Respond to Heat Illness:
- Call 2-2222 on a desk phone or 206-655-2222 on a cell phone if heat stroke is suspected, worker is semi-conscious, unconscious, or unresponsive or confused.
- If practical, move the worker to a cool, shaded area.
- If conscious, provide cool drinking water.
Outdoor Heat Exposure

Program Overview
The Washington State regulation, Outdoor Heat Exposure, [WAC 296-62-095](http://app.leg.wa.gov/WAC/default.aspx?cite=296-62&full=true#296-62-095), covers employees engaged in outdoor work during the period between May 1 and September 30. A combination of clothing and temperatures conditions must be present for the regulation to be in effect during this time period. See the chart in the controls section for details.

Operational Controls

This standard applies only to employees who are working outdoors and exceed the conditions specified in the following table:

<table>
<thead>
<tr>
<th>Clothing type worn by employee</th>
<th>Ambient Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>All other clothing</td>
<td>89°F</td>
</tr>
<tr>
<td>Double-layer woven clothes, including coveralls, jackets, sweatsuits</td>
<td>77°F</td>
</tr>
<tr>
<td>Non-breathing clothes including vapor barrier clothing or PPE such as chemical resistant suits</td>
<td>52°F</td>
</tr>
</tbody>
</table>

*Under the applicable temperature conditions, the program does not apply when an employee is working only 15 minutes out of each 60 minute period outdoors.

- Management must supply drinking water at the rate of at least a quart (32 oz.) per employee per hour at all time under the above temperature conditions. Employees must have the opportunity to drink.
- If an employee shows signs or symptoms of a heat-related illness ([http://www.cdc.gov/niosh/topics/heatstress](http://www.cdc.gov/niosh/topics/heatstress)), they must be relieved from duty and provided with a means of reducing body temperature such as removing clothing, drinking water, and/or going into the shade or indoors. A determination must be made if medical attention is necessary. If medical attention is required, [Boeing Health Services Everett](http://companymedical.web.boeing.com/content/clinical_services/clinics/Clinic_Details.asp?ClinicID=3) is available. If an emergency exists, call 2-2222 or from a cell phone, call 206 655-2222.

Communication Materials
EHS Bulletins: Weather ([/sites/EHS_BCA/Everett/Pages/Safety/general/bulletins/bulletins.aspx#weather](/sites/EHS_BCA/Everett/Pages/Safety/general/bulletins/bulletins.aspx#weather))

Training
Employees routinely working outdoors (e.g., flightline, AOG, exterior forklift drivers, EMC) must have the web-based initial training in outdoor heat exposure, Boeing course Heat and Sun Related Illness ([TR012276](https://mylearn.ss.web.boeing.com/psc/mylprd/EMPLOYEE/ELM/s/WEBLIB_LM_LM/SCRIPT.FieldFormula.IScript.DISP_MENU_FRAMESET?activity_id=2869934&lc_id=3233592&enrollment_ID=228877803&non_compliant_URL=https%3A%2F%2Fcore-boeing.bravais.com/apl/dynamic/launch/6e9c2d83-be8e-4460-ac35-1cf200976aa7%3FcourseID%3DXyleme%26CourseCode%3dTTR012276%26LMID%3d20639714)).

Requirements Documents
**Assessments**

Reference Table: Heat Stress for Outdoor Work

<table>
<thead>
<tr>
<th>Type of Work</th>
<th>Clothes</th>
<th>Temperature</th>
<th>Work time per hour</th>
<th>Break time per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting, Standing, Walking without a load, outdoors</td>
<td>Normal Clothes</td>
<td>up to 70 F</td>
<td>60 minutes</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 80 F</td>
<td>60 minutes</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 90 F</td>
<td>60 minutes</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 100 F</td>
<td>44 minutes</td>
<td>16 minutes</td>
</tr>
<tr>
<td>Pushing or pulling a cart, carrying a load, outdoors</td>
<td>Normal Clothes</td>
<td>up to 70 F</td>
<td>60 minutes</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 80 F</td>
<td>60 minutes</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 90 F</td>
<td>46 minutes</td>
<td>14 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 100 F</td>
<td>33 minutes</td>
<td>27 minutes</td>
</tr>
<tr>
<td>Work with a manual or machine tool, painting, inspection, outdoors</td>
<td>Tyvek coveralls</td>
<td>up to 70 F</td>
<td>47 minutes</td>
<td>13 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 80 F</td>
<td>36 minutes</td>
<td>24 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 90 F</td>
<td>29 minutes</td>
<td>31 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 100 F</td>
<td>24 minutes</td>
<td>36 minutes</td>
</tr>
<tr>
<td></td>
<td>White Fuel Cell coveralls or Blue seal coveralls</td>
<td>up to 70 F</td>
<td>60 minutes</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 80 F</td>
<td>58 minutes</td>
<td>2 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 90 F</td>
<td>42 minutes</td>
<td>18 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 100 F</td>
<td>32 minutes</td>
<td>28 minutes</td>
</tr>
<tr>
<td></td>
<td>Normal Clothes</td>
<td>up to 70 F</td>
<td>60 minutes</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 80 F</td>
<td>60 minutes</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 90 F</td>
<td>50 minutes</td>
<td>10 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 100 F</td>
<td>36 minutes</td>
<td>24 minutes</td>
</tr>
<tr>
<td>Work inside a confined space with ventilation (wet fuel cell entry, dry fuel cell entry), outdoors</td>
<td>White Fuel Cell coveralls or Blue seal coveralls</td>
<td>up to 70 F</td>
<td>60 minutes</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 80 F</td>
<td>40 minutes</td>
<td>20 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 90 F</td>
<td>28 minutes</td>
<td>32 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 100 F</td>
<td>24 minutes</td>
<td>36 minutes</td>
</tr>
<tr>
<td></td>
<td>Chemsplash coveralls</td>
<td>up to 70 F</td>
<td>38 minutes</td>
<td>22 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 80 F</td>
<td>31 minutes</td>
<td>29 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 90 F</td>
<td>25 minutes</td>
<td>35 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 100 F</td>
<td>22 minutes</td>
<td>38 minutes</td>
</tr>
</tbody>
</table>

Relative humidity is assumed to be 70% (summer average for Seattle)

Considerations- confined spaces may be hotter than outdoor temps (approximately 10 degrees hotter)
Surface Burns

There are no OSHA or WA DOSH guidelines which address heated surfaces, although OSHA does consider exposed heated surfaces, if there is a potential for injury to be a hazard. Any surfaces that could cause burns should be insulated or covered to prevent contact.


EHS Contact

Abigail Sutphen (https://insite.web.boeing.com/culture/displayBluesInfo.do?bemsid=2226495) or your area Industrial Hygienist (/sites/EHS_BCA/Everett/Pages/Industrial_Hygiene/staff-ih_Everett.aspx)

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