

# Heat Stress

John Newquist

# July 2016

- Chicago
- Thirteen people were hospitalized for heat-related illnesses at a Chicago post office Saturday morning, officials confirmed.
- Temperature heat index was 107F
- Air conditioning broke



# Data

- 2,500 workers suffered from heat illness every year
- 150-240 are admitted to hospital ever year.
- 70% die on the first day from Heat stroke.
- 30% under 90 degree heat index.



# 2011

- Lehigh Valley, PA
- Working conditions at the warehouse got worse earlier this year, especially during summer heat waves when heat in the warehouse soared above 100 degrees.
- One hot day, Goris said, he saw a co-worker pass out at the water fountain.
- On other hot days, he saw paramedics bring people out of the warehouse in wheelchairs and on stretchers.



Citation 1 Item 1 Type of Violation: **Serious**

OSH ACT of 1970 Section (5)(a)(1): Section 5(a)(1) of the Occupational Safety and Health Act of 1970: The employer did not furnish employment and a place of employment which was free from recognized hazards that were causing or likely to cause death or serious physical harm to employees in that employees worked around Rotational Molding Machine ovens, for 12 hours per day, exposing them to excessive heat which could result in heat related illnesses:

a.) Sterling Technologies Inc., Production Area- On or about July 22, 2015, machine operators operating molding ovens including, but not limited to, machine numbers 280, FS120 and 330 were exposed to excessive heat throughout their work-shift with an hourly time weighted average heat exposure of 82.6 degrees Fahrenheit wet bulb globe temperature (WBGT).

b.) Sterling Technologies Inc., Production Area- On or about July 29, 2015, machine operators operating molding ovens including, but not limited to, machine numbers 280, FS120 and 330 were exposed to excessive heat throughout their work-shift with an hourly time weighted average heat exposure of 93.1 degrees Fahrenheit wet bulb globe temperature (WBGT).

c.) Sterling Technologies Inc., Production Area- On or about September 4, 2015, machine operators operating molding ovens including, but not limited to, machine numbers 280, 220 and 330 were exposed to excessive heat throughout their work-shift with an hourly time weighted average heat exposure of 86.6 degrees Fahrenheit wet bulb globe temperature (WBGT).

# OSHA Requirements

- Use heat stress meter or get weather app
- Heat stress illness prevention program
- Work Rest Regimen
- Employee Training
- Management Training
- Implement a heat acclimatization program for new employees, for employees returning to work from absences of four or more days.



# OSHA Requirements

- Permit only those workers acclimatized to heat to perform the more strenuous tasks. Rotate physically demanding job tasks among acclimatized workers.
- Cool drinking water and/or other hydrating beverages.
- Encourage employees to drink 5 to 7 ounces of cool water every 15 to 20 minutes.





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**¡Menténcese con nosotros!**



# Hoover Dam

- 1932 – workers with heat cramps had lower concentration of salt in the blood and urine.



- The Cowboys and Eagles played in 109-degree heat, but the Philadelphia players seemed more energized.
- The players are crediting pickle juice, which trainer Rick Burkholder recommended to combat the heat.
- NYT – The reaction, for some, was rapid. Within about 85 seconds, the men drinking pickle juice stopped cramping. But the cramps continued unabated in the men drinking water. Pickle juice had “relieved a cramp 45 percent faster” than drinking no fluids and about 37 percent faster than water, concluded the authors of the study

# Pickle Juice?



# Pickle Juice

- 2016 Pickle juice calming reflex per MacKinnon and Bean research.
- 2010 - cramps happen without change in electrolytes Kevin Miller , PhD
- 1997 – muscle neuro receptors imbalance cause cramps. South Africa study.



# Anti Cramp Tactics

- Sugar, Vinegar, Capsaicin have worked.
- Sleep,
- Exercise



<b>Heat Index</b>	<b>Risk Level</b>	<b>3URWHFWLYH 0HDVXUHV</b>
Less than 91°F	Lower (Caution)	Basic heat safety and planning
91° to 103°F	Moderate	Implement precautions and heighten awareness
103° to 115°F	High	Additional precautions to protect workers
Greater than 115°F	Very High to Extreme	Triggers even more aggressive protective measures

The heat index values were devised for shady, light wind conditions. Exposure to full sunshine can increase heat index values by up to 15° Fahrenheit.

Plan Element	Heat Index Risk Level			
	Lower (Caution)	Moderate	High	Very High/Extreme
Supplies (ensuring adequate water, provisions for rest areas, and other supplies)	✓	✓	✓	✓
Emergency planning and response (preparing supervisors and crews for emergencies)	✓	✓	✓	✓
Worker acclimatization (gradually increasing workloads; allowing more frequent breaks as workers adapt to the heat)	✓	✓	✓	✓
Modified work schedules (establishing systems to enable adjustments to work schedules)		✓	✓	✓
Training (preparing workers to recognize heat-related illness and preventive measures)	✓	✓	✓	✓
Physiological, visual, and verbal monitoring (using direct observation and physiological monitoring to check for signs of heat-related illness)		✓	✓	✓

# Sunburn

Heat stress can be more than a minor inconvenience for those who work in extremely warm conditions.

## Symptoms:

- Red, painful skin (first degree burns)
- Blistering and/or peeling (second degree burns)

## Treatment:

- Skin lotions
- Topical anesthetics

## Prevention:

- Limit sun exposure on bare skin



# Dehydration





# Heat Rash and Cramps

## Symptoms:

- Red rash and itching
- Hot, moist skin
- Normal to slightly high body temperature

## Treatment:

- Ointment – Aloe Vera

## Prevention:

- Keep skin dry and clean
- Loosen clothing
- Drink lightly salted liquids (0.1% saline)
- Seek medical aid if cramps persist



## Agotamiento



Mareos



Dolor de cabeza



Mucho sudor



Debilidad



Calambres



Náuseas y vómitos



Pulso rápido



## Insolación



Piel colorada, caliente y seca



Temperatura alta



Desorientación



Convulsiones



Desmayo



**OJO con los primeros síntomas.** Podrían necesitar atención médica.

Las personas reaccionan de diferentes maneras.

Podrían tener unos cuantos de estos síntomas o la mayoría de ellos.

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# Heat Exhaustion

## Symptoms:

- Heavy sweating.
- Intense thirst from dehydration.
- Fatigue, weakness, or loss of coordination.
- Tingling in hands and feet or headache.

## First Aid Treatment:

- Loosen or remove clothing and boots.
- Cool the victim as quickly as possible.
- Call 911 if victim becomes faint or is unconscious.



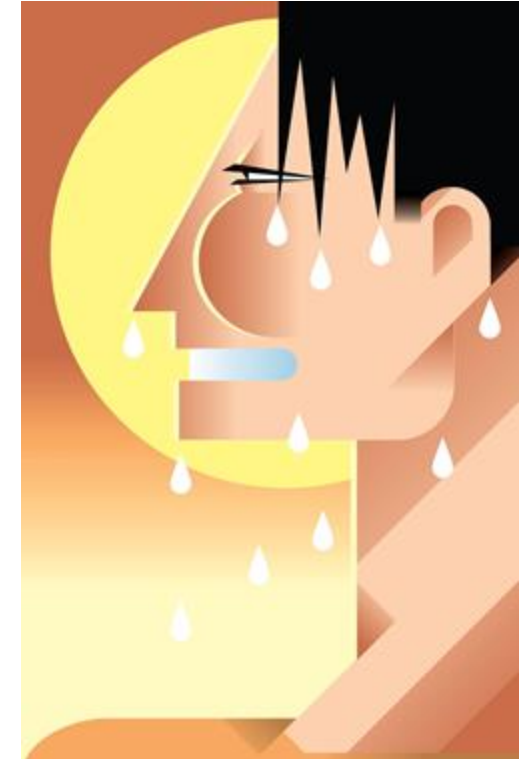
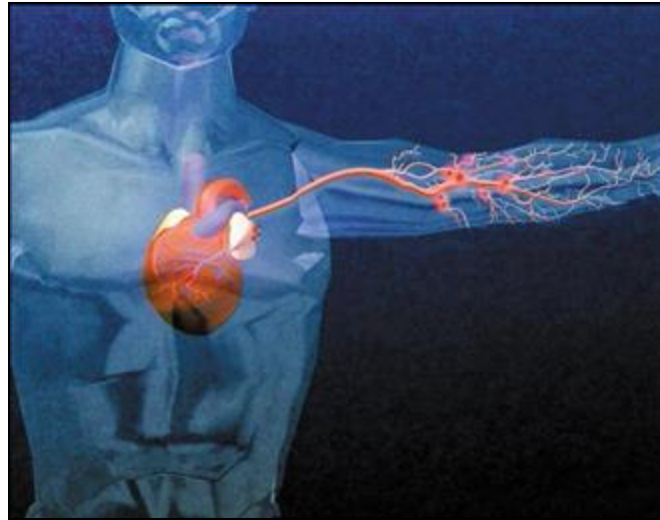
# Heat Stroke

## Early Symptoms:

- High body temperature
- Hot, red or flushed, **dry** skin
- Headache or dizziness
- Confusion or delirium

## Advanced Symptoms:

- Seizure or convulsions
- Loss of consciousness
- No detectable pulse



**CALL 911 AT THE FIRST  
SIGN OF THE ABOVE  
SYMPTOMS!**

# Heat Stroke

## Treatment:

- Lower the victim's body temperature as quickly as possible.
- Don't give liquids to unconscious victims.

## Other tips for controlling heat stress:

- Allow your body to become acclimatized to your surroundings.
- Follow scheduled work/rest cycles to avoid overexertion.
- Drink **5-7** ounces of cool water every 15 minutes.
- Consume a light, cool lunch instead of hot, heavy meals.



# CAL OSHA Heat Illness Standard: Cool-down Rest Periods

- Must be allowed and encouraged.
- Employees shall be monitored for symptoms and signs of heat illness (observation and inquiry is sufficient).
- If symptoms or signs occur:
  - First aid or emergency response is required (based on level of heat-related illness).
  - Workers must not be ordered back to work, sent home, or left alone until symptoms have abated.



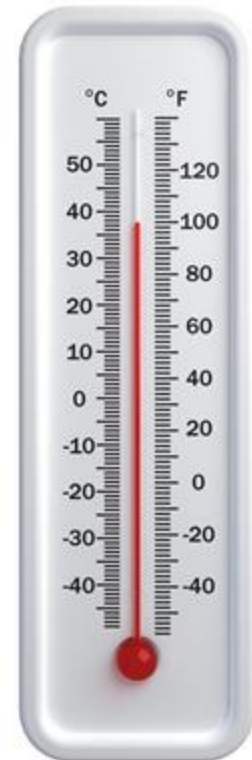
# CAL OSHA Heat Illness Standard: Water

- One quart per person, per hour (2 gallons for an 8-hr shift).
- Must be “*fresh, pure, suitably cool... free of charge*” (potable water, not ice cold).
- As close as practicable to worksite (if not plumbed or supplied at site).
- Educate workers and actively encourage them to drink small amounts of water often (up to 4 cups/hour).



# CAL OSHA Heat Illness Standard: High Heat Procedures

- Triggered at 95F (unchanged in regulation).
- Pre-shift meeting to review high heat procedures.
- Observation of employees for signs and symptoms.
- Mandatory 10 minutes cool-down recovery time for each two hour period of continuous work.
- Employees must be authorized and able to call for emergency service (or designate one employee onsite).





# CAL OSHA Heat Illness Standard: Emergency Response

- Ensure effective communication with employees.
- First aid procedures.
- Emergency medical services (how and when are they provided?).
- “Clear and precise” directions to the worksite.
- Employees must be able to call for emergency service.



# CAL OSHA Heat Illness Standards

## Acclimatization

- Include concept/definition and specific procedures in training and written plan.
- Applies to new employees, heatwave events, and employees returning to work after extended absence from heat.
- New employees must be observed for first 14 days.
- All employees observed during heat wave events ( $\geq 80F$  AND 10 degrees higher than average of previous 5 days).
- Procedure: define gradual increase in work hours over multi-day period or define alternative work arrangements.



# CAL OSHA Heat Illness Standard: Training

- Employer responsibilities and worker's rights.
- Signs and symptoms of heat illness.
- Personal/environmental risk factors and acclimatization.
- First aid and emergency response for various levels of heat illness.
- High heat procedures (pre-shift meeting required).
- Emergency response procedures.



# CAL OSHA Heat Illness Standard: Written Plan

- Heat Illness Prevention Plan (English/Spanish).
- Must be available at worksite upon request:
  - Procedures for complying with standard (water, shade, training)
  - High heat procedures
  - Emergency response procedures
  - Acclimatization procedures
- Updated template available from EHS by May 1.



# Electrolyte Candies



# Summary

- Watch New Workers
- Train people in the symptoms
- Take precautions above 80F
- Heat Stroke needs 911 and immediate cooling