

Heat Illness Prevention in Indoor Work Environments

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Topics

- Existing Heat Illness Standard §3395
- Why an Indoor Heat Standard?
- Status on the Proposed Indoor Heat Standard
- ACGIH and NIOSH Recommended Standards

The Dog Days of Summer!

According to NIOSH:

- Extreme heat causes more deaths than any other weather-related hazard
- Each year more than 65,000 people seek medical treatment for extreme heat exposure

According to Fed/OSHA:

- 2,630 workers suffered heat-related illness in 2014
- 18 deaths from heat stroke and related causes on the job

Cal/OSHA Enforcement Actions

- Inspections (as reported 11/1/18)
 - 2,977 in 2018 (as of 9/30/18)
 - 4,150 in 2017
 - 4,014 in 2016
- Most Frequently Cited provisions
 - Lack of/inadequate written program
 - Training
 - Provision of water
- Injuries
 - 1 heat related fatality confirmed each year bet 2014 & 2017
 - 76 heat related illness confirmed in 2017
 - 52 heat related illness confirmed in 2016

Existing Heat Illness Standard

- 8CCR§3395
 - Operative 8-22-2005
 - Amended 4-3-2015
- Applies to “all **outdoor** places of employment”
 - There is no exposure time or task exclusion
- Basic requirements
 - Access to potable water
 - Access to shade when temperature **exceeds 80 F**
 - High-temp requirements (**95 F**) [not all industries]
 - Emergency Response
 - Acclimatization
 - Training
 - Written Heat Illness Prevention Plan

Indoor Heat Illness

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Basis for Indoor Heat Bill

- 2012 – warehouse worker became ill during unloading product from freight containers placed indoors.
- Cal/OSHA cited the warehouse employer and the staffing employer for an “ineffective IIPP”
- Both companies appealed citation and won
- March 2015 – Cal/OSHA appealed ALJ decision stating that employers failed to correct the indoor heat hazard and train employees on hazard.
- November 2015 – ALJ’s decision was overturned by Appeals Board
- Due to this case, SB1167 was proposed for DOSH to establish an Indoor Heat Standard. Signed by Governor in 2016

SB1167 – Indoor Heat Bill

- Bill requires DOSH to develop a standard by Jan 1, 2019 to prevent heat illness in indoor places of employment.
- The standard must be based on:
 - Environmental temperature
 - Work activity levels
 - Other factors
- The standard “*shall take into consideration heat stress and heat strain guidelines in the 2016 Threshold Limit Values....developed by the ACGIH*”
- Does not prohibit DOSH from proposing standards that limit high heat to certain industry sectors.

Status of Indoor Heat Standard

- Advisory Committee Formed
 - Meeting February 28, 2017
 - Meeting May 25, 2017
 - Last meeting February 8, 2018
- Initial Draft Language Proposed (2/22/17)
 - Separate standards for Indoor and Outdoor Heat Illness
 - Definition of “indoor” [vehicles?]
 - Many stakeholders believe that an industry specific standard should be adopted, e.g., foundry work, garment, warehousing
- ACGIHTLV ignored in all proposals

Proposed Standard Revisions

- Revisions to the standard:
 - February 15, 2018
 - May 16, 2018
 - October 24, 2018
 - February 22, 2019

Current Version of Indoor Heat Standard

This standard applies to all indoor work areas where the temperature equals or exceeds **82 degrees Fahrenheit** when employees are present

EXCEPTION: Employer is required to measure temperature or heat index (Assessment) and establish Controls if:

- Temperature is ≥ 87 F [was set at 90 F]
- Heat Index is ≥ 87 F [was set at 90 F]
- Employees wear clothing that restricts heat removal AND temperature is ≥ 82 F.
- Employees work in high radiant heat area AND temperature is ≥ 82 F

Definitions

- INDOOR – refers to a space that is:
 - Under a ceiling or overhead covering;
 - Is enclosed along its perimeter by walls, doors, windows, dividers, or other physical barriers, whether open or closed.
 - Not considered outdoor or covered by §3395
- HEAT INDEX – refers to a measure of heat stress used by the National Weather Service.
 - Radiant heat is not included in heat index

Steps for Compliance

- (c) Provision of Water
 - Plumbed or otherwise
- (d) Access to Cool-Down areas
 - Large enough to accommodate the number of employees on recovery or rest periods
 - Close to affected employees
- (e) Assessment Measures
 - Measure temperature/heat index
 - Maintain readings for 1 year

Steps for Compliance

- (e) Control Measures
 - Engineering controls
 - Administrative controls *
 - Personal Protective Equipment*
- * If engineering controls are not sufficient
- (f) Emergency Response Procedures
- (g) Close Observation during Acclimatization
 - If temperature is 10 degrees F above high daily average for 5 days
 - Newly assigned employee

Steps for Compliance

- (h) Training
 - Employee
 - Supervisor
- (i) Heat Illness Prevention Plan
 - English and language understood by majority of employees
 - Made available to employees
 - May be part of the IIPP or Heat Illness Plan

NOAA Heat Index

		Relative Humidity (%)																			
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
80	77	78	78	79	79	79	80	80	80	81	81	82	82	83	84	84	85	86	86	87	87
81	78	79	79	79	79	80	80	81	81	82	82	83	83	84	85	86	86	87	88	88	89
82	79	79	80	80	80	80	81	81	82	82	83	84	85	86	87	88	89	90	91	93	95
83	79	80	80	81	81	81	82	82	83	84	85	86	87	88	90	91	93	95	97	99	
84	80	81	81	81	82	82	83	83	84	85	86	88	89	90	92	94	96	98	100	103	
85	81	81	82	82	82	83	84	84	85	86	88	89	91	93	95	97	99	102	104	107	
86	81	82	83	83	83	84	85	85	87	88	89	91	93	95	97	100	102	105	108	112	
87	82	83	83	84	84	85	86	87	88	89	91	93	95	98	100	103	106	109	113	116	
88	83	84	84	85	85	86	87	88	89	91	93	95	98	100	103	106	110	113	117	121	
89	84	84	85	85	86	87	88	89	91	93	95	97	100	103	106	110	113	117	122		
90	84	85	86	86	87	88	89	91	92	95	97	100	103	106	109	113	117	122	127		
91	85	86	87	87	88	89	90	92	94	97	99	102	105	109	113	117	122	126	132		
92	86	87	88	88	89	90	92	94	96	99	101	105	108	112	116	121	126	131			
93	87	88	89	89	90	92	93	95	98	101	104	107	111	116	120	125	130	136			
94	87	89	90	90	91	93	95	97	100	103	106	110	114	119	124	129	135	141			
95	88	89	91	91	93	94	96	99	102	105	109	113	118	123	128	134	140				
96	89	90	92	93	94	96	98	101	104	108	112	116	121	126	132	138	145				
97	90	91	93	94	95	97	100	103	106	110	114	119	125	130	136	143	150				
98	91	92	94	95	97	99	102	105	109	113	117	123	128	134	141	148					
99	92	93	95	96	98	101	104	107	111	115	120	126	132	138	145	153					
100	93	94	96	97	100	102	106	109	114	118	124	129	136	143	150	158					
101	93	95	97	99	101	104	108	112	116	121	127	133	140	147	155						
102	94	96	98	100	103	106	110	114	119	124	130	137	144	152	160						
103	95	97	99	101	104	108	112	116	122	127	134	141	148	157	165						
104	96	98	100	103	106	110	114	119	124	131	137	145	153	161							
105	97	99	102	104	108	112	116	121	127	134	141	149	157	166							
106	98	100	103	106	109	114	119	124	130	137	145	153	162	172							
107	99	101	104	107	111	116	121	127	134	141	149	157	167								
108	100	102	105	109	113	118	123	130	137	144	153	162	172								
109	100	103	107	110	115	120	126	133	140	148	157	167	177								
110	101	104	108	112	117	122	129	136	143	152	161	171									
111	102	106	109	114	119	125	131	139	147	156	166	176									
112	104	107	111	115	121	127	134	142	150	160	170	181									
113	104	108	112	117	123	129	137	145	154	164	175										
114	105	109	113	119	125	132	140	148	158	168	179										
115	106	110	115	121	127	134	143	152	162	173	184										
116	107	111	116	122	129	137	146	155	166	177											
117	108	112	118	124	132	140	149	159	170	181											
118	108	113	119	126	134	142	152	162	174	186											
119	109	114	121	128	136	145	155	166	178												
120	110	116	122	130	138	148	158	170	182												
121	111	117	124	132	141	151	162	174	187												
122	111	118	125	134	143	154	165	178													
123	112	119	127	136	146	157	169	182													
124	113	120	129	138	148	160	172														
125	114	121	130	140	151	163	176														

Heat Index



Extreme Danger	Heat stroke likely.
Danger	Sunstroke, muscle cramps, and/or heat exhaustion likely. Heatstroke possible with prolonged exposure and/or physical activity.
Extreme Caution	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Caution	Fatigue possible with prolonged exposure and/or physical activity.

Appendix A - Heat Index Chart

Heat Index in Degrees Fahrenheit
Relative Humidity %

	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
81	78	79	79	79	79	80	80	81	81	82	82	83	84	85	86	86	87	88	90	91
82	79	79	80	80	80	80	81	81	82	83	84	84	85	88	88	89	90	91	93	95
83	79	80	80	81	81	81	82	82	83	84	85	86	87	90	90	91	93	95	97	99
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90	84	85	86	86	87	88	89	91	93	95	97	100	103	106	109	113	117	122	127	
91	85	86	87	87	88	89	90	92	94	97	99	102	105	109	113	117	122	126	132	
92	86	87	88	88	89	90	92	94	96	99	101	105	108	112	116	121	126	131		
93	87	88	89	89	90	92	93	95	98	101	104	107	111	116	120	125	130	136		
94	87	89	90	90	91	93	95	97	100	103	106	110	114	119	124	129	135	141		
95	88	89	91	91	93	94	96	99	102	105	109	113	118	123	128	131	140			
96	89	90	92	93	94	96	98	101	104	108	112	116	121	126	132	138	145			
97	90	91	93	94	95	97	100	103	106	110	114	119	125	130	136	143	150			
98	91	92	94	95	97	99	102	105	109	113	117	123	128	134	141	148				
99	92	93	95	96	98	101	104	107	111	115	120	126	132	138	145	153				
100	93	94	96	97	100	102	106	109	114	118	124	129	136	143	150	158				
101	93	95	97	99	101	104	108	112	116	121	127	133	140	147	155					
102	94	96	98	100	103	106	110	114	119	124	130	137	144	152	160					
103	95	97	99	101	104	108	112	116	122	127	134	141	148	157	165					

ACGIH Recommended TLVs

- Goal is maintaining body core temperature with $+1\text{C}$
- Decision-making process
 - Clothing
 - Air and vapor movement (permeability, insulation, evaporative)
 - WBGT
 - Direct exposure to sunlight
 - Temp, humidity, Air movement
 - $WBGT = 0.7t_{nwb} + 0.3t_g$ Indoors
 - $WBGT = 0.7t_{nwb} + 0.2t_g + 0.1t_a$ Outdoors
 - t_{nwb} = humidity and wind t_g = air temp and radiation t_a = air temp
 - Work/Rest regimen



TABLE 10. Screening Criteria in °C- and °F-WBGT from Which the Values in Table 2 Were Derived

TLV		°C-WBGT			
%Work	L	M	H	VH	
100	30.8	28.2	26.6	25.5	
75	31.2	29.0	27.6	26.5	
50	31.8	30.1	28.8	27.9	
25	32.3	31.3	30.5	29.8	

		°F-WBGT			
%Work	L	M	H	VH	
100	87.4	82.8	79.9	77.8	
75	88.2	84.3	81.7	79.8	
50	89.2	86.1	83.9	82.3	
25	90.2	88.4	86.9	85.7	

ACTION LIMIT		°C-WBGT			
%Work	L	M	H	VH	
100	28.1	25.0	23.0	21.6	
75	28.7	26.0	24.2	22.9	
50	29.3	27.2	25.7	24.6	
25	30.0	28.8	27.8	27.0	

		°F-WBGT			
%Work	L	M	H	VH	
100	82.6	77.0	73.4	70.9	
75	83.6	78.8	75.6	73.3	
50	84.8	81.0	78.3	76.3	
25	86.1	83.8	82.0	80.6	

Criteria for a Recommended Standard

Occupational Exposure to Heat and Hot Environments

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health



8 - Basis for the Recommended Standard

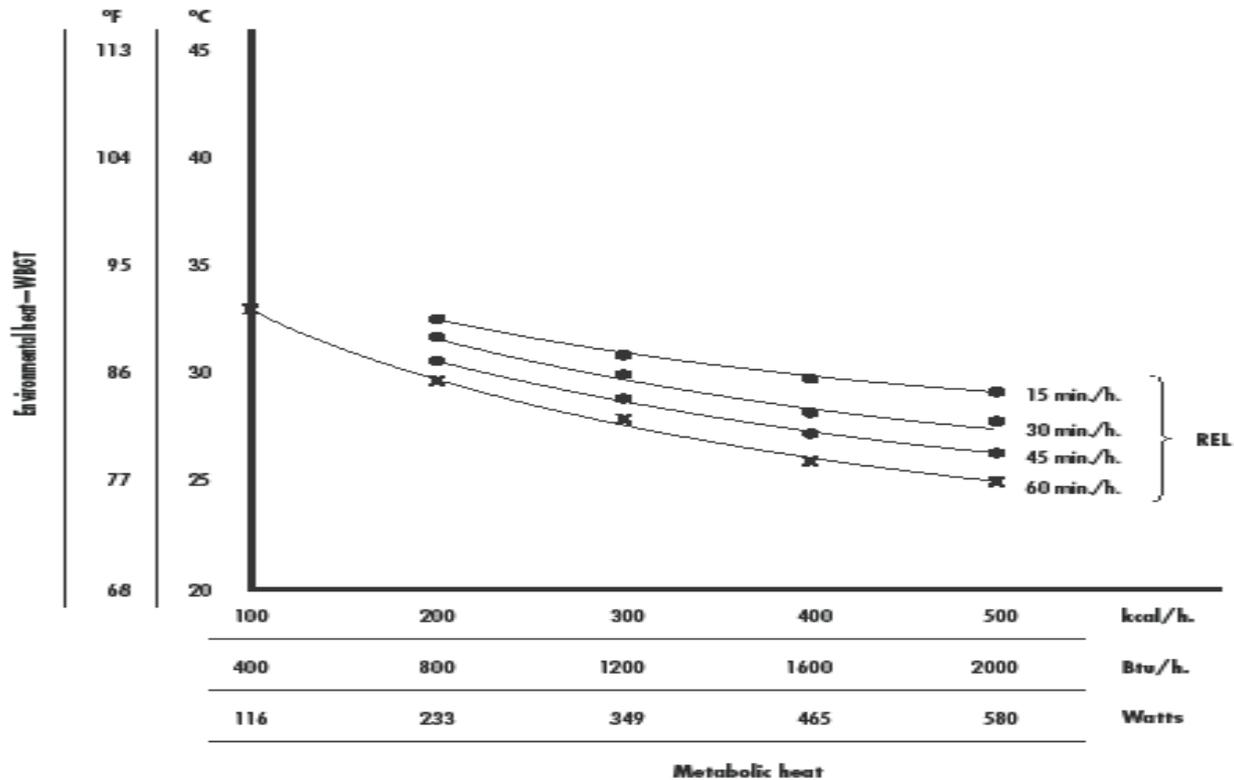


Figure 8-2. Recommended heat stress exposure limits (RELs) for acclimatized workers

Values shown are for a “standard man” of 70 kg (154 lb) body weight and 1.8 m² (19.4 ft²) body surface. The “standard man” is used to normalize the data from the variability found in human beings. Both men and women adapt well to heat exposure, and given the similar physiological ability to tolerate heat, there are no significant differences between the sexes.

Sources: [Leithead and Lind 1964; Wyndham 1974; Ramsey 1975; Strydom 1975; ISO 1982a; Spaul and Greenleaf 1984; ACGIH 1985].

QUESTIONS????

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