

HEAT SAFETY



SMART STEPS CAN HELP CREWS AVOID HEAT-RELATED INJURIES

FROM FREQUENT BREAKS TO WEARING THE RIGHT GEAR, WORKING
IN HIGH TEMPS REQUIRES AWARENESS AND PLANNING.



President Harry Truman famously offered advice to those who did not like the pressures of governing: “If you can’t stand the heat, get out of the kitchen.” But Truman never worked during August as a lineman in California, as a landscaper in New Jersey, on a construction site in North Carolina, on an oil rig off the Texas coast or in a Kentucky steel plant.

For workers exposed to the elements during hot, humid weather months there is no escaping the heat. A 2021 study by the University of California, Los Angeles (UCLA) that reviewed 11 million California workers’ compensation claims filed between 2001 and 2018 found that the risk of worker injuries on days when temperatures exceeded 90 degrees increased by 6% to 9% compared with days with highs in the 50s and 60s. The risk of injuries jumped by 10% to 15% on days when temperatures soared above 100 degrees.

The UCLA study found that not only did cases of heat exhaustion and heat stroke go up during extremely hot days, but so did other job site injuries. Whether your crew is working outdoors or inside in a manufacturing plant or warehouse that is not air-conditioned, extreme heat creates potential dangers. Prolonged exposure to heat causes fatigue, distraction and errors in judgment that lead to mistakes, accidents and injuries. UCLA researchers estimated that heat-related injuries in the state were actually undercounted by around 20,000 a year.

ACT BEFORE IT GETS HOT

The U.S. Occupational Safety and Health Administration (OSHA) estimates that 50% to 70% of outdoor worker heat-related fatalities occur in the first few days of working in hot weather because the body needs time to build up tolerance and adjust to the heat. The lack of acclimation to high temperatures is a major risk factor, according to OSHA.

The OSHA website states: “Occupational risk factors for heat illness include heavy physical activity, warm or hot environmental conditions, lack of acclimatization and wearing clothing that holds in body heat.”

A number of states have implemented work safety rules that are tied to thermometer readings, in some cases mandating regular rest and cooling periods when temperatures reach certain levels. Others require employers to address heat exposure as part of job site safety training.

EDUCATE YOUR CREW

Making sure your teams understand that heat stress can be dangerous and educating them about ways to beat the heat are key steps you can take before

extreme heat conditions arrive. They need to understand the importance of staying hydrated, taking breaks to cool down and keeping an eye on fellow workers.

It is important to recognize that extreme heat can dramatically reduce worker productivity. It is important to recognize that extreme heat can dramatically reduce worker productivity, according to a study by the Adrienne Arsht-Rockefeller Foundation Resilience Center (Arsht-Rock). The organization looked at worker productivity losses caused by extreme heat in 12 major cities around the world and put the 2020 cost at \$44 billion, with the amount projected to rise to \$84 billion by 2050 unless global warming trends are reduced. Currently, 354 cities have average summertime highs of 95 degrees, and by 2050 that number is expected to climb to 970 cities.

Los Angeles and Miami were included in the Arsht-Rock study, which said manufacturing, construction, logistics and business administration are the hardest-hit segments in those markets. The report notes that workers not only tend to perform tasks more slowly in extreme heat, they are more prone to mistakes, have reduced decision-making capabilities, and have increased accident and injury rates.

**WORKER PRODUCTIVITY LOSSES
DUE TO HEAT ESTIMATED AT
\$44 BILLION**

PROVIDE THE RIGHT EQUIPMENT AND TOOLS

Companies should look for ways to improve job site resiliency by building in plans for dealing with extreme temperatures. During the high-heat months, providing workers with portable fans, water misters and simple barrier protection, like tarps or screens, can help reduce the danger.

Job site managers can look to professional and amateur sports for some examples on how to deal with extreme conditions. Some sports have shifted game times and installed mandatory water breaks during competitions, offering players both cooling-down periods and the ability to rehydrate. Athletic uniform materials have advanced significantly in recent years with the introduction of lighter-weight fabrics that offer moisture-wicking characteristics.

No matter what other steps you take, providing personal protective equipment (PPE) with advanced fabric technologies in the form of uniforms employees will actually wear is one of the most effective lines of defense against heat stress. Inappropriate clothing can actually increase the heat load on the body, increasing the potential for heat-related illnesses.

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PERSONAL PROTECTIVE EQUIPMENT

is one of the most effective lines of defense against heat stress.

The Carhartt Force® line is specially built to enhance the body's natural self-regulating processes. Force features a cotton/poly fabric blend with Fast Dry® wicking technology to speed up the conversion of moisture to vapor so clothing dries faster and keeps workers comfortable on even the hottest of days. Force fabrics are also available in flame-resistant (FR) and high-vis apparel.

The introduction of Carhartt's FR Force Lightweight shirt—Carhartt's lightest, most breathable shirt—marked a new high point in PPE technology. Engineered to meet the most stringent industry standards—CAT2 ATPV 8.6 cal/cm² and UL-certified—NFPA 2112—with exclusive 4.7 oz. fabric that delivers the ultimate in breathability and moisture-wicking performance.

PROTECTION PUT TO THE TEST

The FR Force Lightweight Long-Sleeve Shirt's innovative weave design features yarns produced from fibers optimized to deliver more FR protection per ounce. Built with Carhartt Force® technology to wick sweat and fight odors. Engineered with 10% stretch for increased mobility, wrinkle resistance, antistatic properties and long-lasting color wash after wash.

To prove the 4.7 oz. shirt is the lightest, most breathable FR shirt ever created by Carhartt, engineers sent samples of these FR shirts and some competitors' shirts to Kansas State University to evaluate the thermal and evaporative resistance properties of the garments. The evaluation was conducted as a blind test. Sample 3 data (highlighted) represents the performance of the 4.7 oz FR shirt as compared to the others.

EVAPORATIVE RESISTANCE TEST RESULTS

| Ensemble Code and Description | Total Local Evaporative Resistance Values for Torso and Arms ² | Total Local Evaporative Resistance Values for Torso ² | Total Evaporative Resistance R _{et} (m ² •Pa/W) | Intrinsic Evaporative Resistance of Clothing - R _{cl} (m ² •Pa/W) ² | Moisture Permeability Index - i ^m |
|--|---|--|---|--|--|
| SAMPLE 1: CARHARTT FR | 30.55 | 35.03 | 27.97 | 17.23 | 0.36 |
| SAMPLE 2: CARHARTT FR | 31.40 | 34.40 | 28.46 | 17.72 | 0.36 |
| SAMPLE 3: CARHARTT 4.7 OZ. LONG-SLEEVE SHIRT | 29.25 | 32.40 | 27.33 | 16.59 | 0.37 |
| SAMPLE 4: COMPETITOR FR | 31.00 | 34.43 | 27.97 | 17.23 | 0.36 |
| SAMPLE 5: COMPETITOR FR | 30.23 | 35.47 | 27.93 | 17.19 | 0.36 |

THE KANSAS STATE UNIVERSITY TESTING CONCLUDED:

- Lower evaporative resistance values coupled with a higher moisture permeability index are desirable for comfort.
- Carhartt's 4.7 oz. FR Long-Sleeve Shirt led the field in moisture transfer through the garment as indicated by lower resistance values.
- Not only did Carhartt's 4.7 oz. FR Long-Sleeve Shirt yield the best results for reduced heat stress and hot weather comfort, it outperformed other workwear tested in the Kansas State study.

Beyond the wicking characteristics of Carhartt's Force® apparel, many include UPF protection from the harmful rays of the sun, have microbial technology to fight odor and have reflective tape for safety on job sites in the early morning or after sunset.

HEAT EXPOSURE IS SERIOUS

The U.S. Bureau of Labor Statistics reports that an average of

43 WORKERS DIED FROM HEAT EXPOSURE ON THE JOB

annually from 2017–2021, pointing out that the number is likely higher because deaths reported as heart attacks and from other causes were misclassified and actually the result of environmental conditions.

A study led by researchers at the University of Connecticut published in 2023 in the *International Journal of Environmental Research and Public Health* conducted an analysis of exertion-related injuries and fatalities among U.S. laborers. Using OSHA data from 2015–2020, the study found that 91.9% of the 1,546 severe exertion-related injuries and 95% of the 89 exertion-related deaths were heat related.

91.9% OF SEVERE EXERTION-RELATED INJURIES WERE HEAT RELATED

JOBS THAT PACK THE HEAT

According to OSHA, these jobs present the greatest risk for heat-related illnesses and injuries.

OUTDOORS

AGRICULTURE | CONSTRUCTION | LANDSCAPING | MAIL AND PACKAGE DELIVERY | OIL AND GAS WELL OPERATIONS

INDOORS

BAKERIES, KITCHENS AND LAUNDRIES | ELECTRIC UTILITIES | FIRE SERVICE | IRON AND STEEL MILLS, FOUNDRIES | MANUFACTURING WITH HEAT SOURCES/FURNACES, INCLUDING PAPER MILLS AND CONCRETE | WAREHOUSING

CONCLUSION

Heat stress-related injuries are a key concern for workers and companies. Not only do these types of injuries go up during extreme hot weather months, experts believe the number of serious heat-related injuries is underreported. Worker productivity is reduced in hot weather, so taking care of safety issues can also improve worker performance and comfort. Making sure work crews are outfitted in the right uniforms for the conditions can help reduce heat stress and is a smart business strategy.

SPOTTING THE SYMPTOMS OF HEAT-RELATED ILLNESSES

The signs of heat-related illnesses often appear suddenly. Typically, workers may ignore early symptoms, leading to more serious issues. The U.S. Department of Labor says understanding the warning signs of heat-related illnesses and providing immediate first aid are important to job site safety. Below are some symptoms to watch out for.

RHABDOMYOLYSIS

MUSCLE PAIN, DARK URINE OR REDUCED URINE OUTPUT, WEAKNESS

HEAT RASH

CLUSTERS OF RED BUMPS, OFTEN ON THE NECK, UPPER CHEST AND SKIN FOLDS

HEAT SYNGOPE

DIZZINESS, FAINTING

HEAT CRAMPS

MUSCLE SPASMS OR PAIN, OFTEN IN LEGS, ARMS AND TRUNK

HEAT EXHAUSTION

FATIGUE, IRRITABILITY, THIRST, NAUSEA/VOMITING, DIZZINESS, LIGHTHEADEDNESS, HEAVY SWEATING, ELEVATED BODY TEMPERATURE, FAST HEART RATE

HEAT STROKE

CONFUSION, SLURRED SPEECH, UNCONSCIOUSNESS, SEIZURES, HEAVY SWEATING OR HOT/DRY SKIN, VERY HIGH BODY TEMPERATURE, RAPID HEART RATE

FIRST AID FOR HEAT-RELATED ILLNESSES

A person suffering from a heat-related illness may exhibit several different symptoms at one time, and the illness can progress rapidly if not treated. Take these steps immediately, as directed by the Mayo Clinic and U.S. Centers for Disease Control and Prevention.

- 1** HAVE THEM STOP WORK.
- 2** MOVE THE PERSON OUT OF THE HEAT TO A SHADY OR AIR-CONDITIONED LOCATION.
- 3** REMOVE TIGHT OR HEAVY CLOTHING.
- 4** GIVE THE PERSON CHILLED WATER, A DECAFFEINATED SPORTS DRINK CONTAINING ELECTROLYTES OR OTHER NON-ALCOHOLIC BEVERAGE.
- 5** SPRAY OR SPONGE THE PERSON WITH COOL WATER AND FAN THEM.
- 6** HAVE THEM LAY DOWN WITH THEIR LEGS SLIGHTLY ELEVATED.
- 7** MONITOR THE PERSON CAREFULLY.

If the person shows signs of heat stroke, including fainting, confusion, slurred speech, agitation, seizures, the inability to drink and/or a core temperature above 104 degrees, call 911 immediately. It is important to take steps to reduce the person's core temperature, and this can include pouring cold water over them; placing icepacks under their armpits, groin area and across their neck; or submerging them in a cold tub up to their shoulders.