

## Clothing Selection Impacts Risk of Heat Illness

Heat stress poses health risks that should not be underestimated. Work in hot environments and/or while wearing personal protective equipment (PPE) that interferes with the body's temperature-regulating system can put workers at risk of experiencing a heat illness. Heat illnesses generally occur when high ambient temperatures, either indoor or outdoor, overcome the body's natural ability to dissipate heat. While some heat illnesses are mild—such as heat rashes or muscle cramps—many heat illnesses are serious and even life-threatening, including heat exhaustion (possibly with fainting) and heat stroke.

DOE and Contractor sites must address heat illnesses in their written worker safety and health program consistent with Title 10 Code of Federal Regulations Part 851 and DOE Order 440.1B, *Worker Protection Program for DOE (including NNSA) Federal Employees*, and therefore with the American Conference of Government Industrial Hygienists (ACGIH) Heat Stress and Strain Threshold Limit Value (TLV). Job planning must consider the hazards of heat stress, including the anticipated ambient temperature, workload, permeability and weight of PPE, and the acclimatization of workers.

Clothing selection is an important part of work planning, as illustrated by the information noted above. Levels of personal protection equipment must be taken into consideration when determining hazard controls for an activity that may be impacted by temperature extremes. PPE is an important part of work planning, and the use of some PPE may make workers more susceptible to heat strain than normal clothing. ACGIH identifies clothing adjustment factors (CAFs) which represent the effects of clothes to determine compliance with the TLV. A variety of specialty personal cooling PPE options exists, from air- and water-cooled garments to ice vests and Personal Ice Cooling Systems.

It is important that workers be educated on the risks of heat exposure, preventive measures to mitigate the risks, and the signs, symptoms, and treatment for heat illnesses. For more information, please see Operating Experience Summary 2016-03, [A Hot Topic: Preventing and Recognizing Heat Related Illnesses](#).



Clothing Worn	CAF
Work clothes (long sleeves and pants) Examples: Standard cotton shirt/pants	0
Coveralls (w/only underwear underneath) Examples: Cotton or light polyester material	0
Double-layer woven clothing	3
SMS Polypropylene Coveralls	0.5
Polyolefin coveralls Examples: Micro-porous fabric (e.g., Tyvek™)	1
Limited-use vapor-barrier coveralls Examples: Encapsulating suits, whole-body chemical protective suits, firefighter turn-out gear	11