

H. Paragraph (h) Training

Paragraph (h) of the proposed standard establishes requirements for training on HRI prevention. It addresses the topics to be addressed in training, the types of employees who are to be trained, the frequency of training, triggers for supplemental training, and how training is to be conducted. OSHA regularly includes training requirements in its standards to ensure employees understand the hazards addressed by the standard, the protections they are entitled to under the standard, and the measures to take to protect themselves. Here, OSHA believes that it is essential that employees are trained on heat-related hazards and how to identify signs and symptoms of HRIs as well as on the requirements of the proposed standard and the employer's heat-related policies and procedures. This training ensures that employees understand heat hazards and the workplace specific control measures that would be implemented to address the hazard. The effectiveness of the proposed standard would be undermined if employees did not have sufficient knowledge and understanding to identify heat hazards and their health effects or sufficient knowledge and understanding of their employer's policies and procedures for addressing those hazards.

Surveys and interviews with diverse working populations highlight the need for additional education and training on HRIs and prevention strategies amongst employees (Luque et al., 2020; Smith et al., 2021; Fleischer et al., 2013; Stoecklin-Marois et al., 2013; Langer et al., 2021; Jacklitsch et al., 2018). The NACOSH Heat Injury and Illness Prevention Work Group recommended that both workers and supervisors are trained in heat illness and injury prevention strategies. Additionally, the Work Group recommended that the training program includes the following elements: identification of hazards; mitigation of hazards through prevention; reporting of signs and symptoms; and emergency response. OSHA preliminarily finds that effective training is an essential element of any heat injury and illness prevention program and that the requirements in proposed paragraph (h) are necessary and appropriate to ensure the effectiveness of the standard as a whole.

Proposed paragraph (h)(1) establishes the initial training requirements for all exposed employees. It would require employers to ensure that each employee receives, and understands, training on the topics outlined in proposed paragraphs (h)(1)(i) through (xvi) prior to the employee performing any work at or above the initial heat trigger. Requiring that initial training occur before employees perform any work at or above the initial heat trigger ensures that the employees have all the knowledge necessary to protect themselves prior to their exposure to the hazard.

This provision, like paragraphs (h)(2) through (h)(4), would require employers to ensure that employees, including supervisors and heat safety coordinators, understand the training topics. While OSHA does not mandate testing or specific modes of ascertaining employee understanding of the training materials, OSHA expects that all required training will include some measure of comprehension. Different ways that employers could ensure comprehension of the training materials include a knowledge check (e.g., written or oral assessment) or discussions after the training. Post training assessments may be particularly useful for ensuring employee participation and comprehension when employers offer online training. Proposed paragraph (h)(5), discussed below, includes additional requirements for presentation of the training.

Proposed paragraph (h)(1)(i) would require employers to provide training on heat stress hazards. Heat stress is the total heat load on the body. There are three major types of hazards which contribute to heat stress: (1) environmental factors such as high humidity, high temperature, solar radiation, lack of air movement, and process heat (i.e., radiant heat produced by machinery or equipment, such as ovens and furnaces), (2) use of personal protective equipment or clothing that can inhibit the body's ability to cool itself, and (3) the body's metabolic heat (i.e., heat produced by the body during work involving physical activity and exertion). Employers should make employees aware of all the sources of heat at the workplace that contribute to heat stress.

Proposed paragraph (h)(1)(ii) would require employers to provide training on heat-related injuries and illnesses. See Section IV., Health Effects, for a discussion of HRIs. Examples of heat-related illnesses include heat stroke, heat exhaustion, heat cramps, heat syncope, and rhabdomyolysis. Heat-related injuries that could result from heat illness include slips, trips, falls, and other injuries that could result from the mishandling of equipment due to the effects of heat stress.

Proposed paragraph (h)(1)(iii) would require employers to provide training on risk factors for heat-related injury or illness, including the contributions of physical exertion, clothing, personal protective equipment, a lack of acclimatization, and personal risk factors (e.g., age, health, alcohol consumption, and use of certain medications). As noted above, physical exertion, clothing, and personal protective equipment all increase an employee's heat load. More information on acclimatization and how it affects risk is included in Section V.C., Risk Reduction, and more information about personal risk factors is included in Section IV.O., Factors that Affect Risk for Heat-Related Health Effects.

Proposed paragraph (h)(1)(iv) would require employers to provide training on signs and symptoms of heat-related illness and which ones require immediate emergency action. As defined in proposed paragraph (b), *signs and symptoms of heat-related illness* means the physiological manifestations of a heat-related illness and includes headache, nausea, weakness, dizziness, elevated body temperature, muscle cramps, and muscle pain or spasms. Also defined in proposed paragraph (b), *signs and symptoms of a heat emergency* means the physiological manifestations of a heat-related illness that requires emergency response and includes loss of consciousness (*i.e.*, fainting, collapse) with excessive body temperature, which may or may not be accompanied by vertigo, nausea, headache, cerebral dysfunction, or bizarre behavior. This could also include staggering, vomiting, acting irrationally or disoriented, having convulsions, and (even after resting) having an elevated heart rate. Employers must train employees on how to identify these signs and symptoms of heat-related illness in themselves and their coworkers and when to employ the employer's emergency response procedures, as required under proposed paragraph (g). That provision specifies the actions that an employer must take both when an employee experiences signs and symptoms of a heat-related illness and when an employee experiences signs and symptoms of a heat emergency. For further discussion see the *Explanation of Proposed Requirements* for Paragraph (g).

Proposed paragraphs (h)(1)(v) through (vii) would require employers to train employees on the importance of removing PPE that may impair cooling during rest breaks, taking rest breaks to prevent heat-related illness or injury, and that rest breaks are paid, and drinking water to prevent heat-related illness or injury. Removing PPE when possible, allows employees to cool down faster during rest breaks. As discussed in Section V.C., Risk Reduction, drinking adequate amounts of water and taking rest breaks are important for reducing heat strain that could lead to HRI. Training on these topics could give the employer an opportunity to address common misperceptions regarding heat, such as that drinking cold water in the heat is harmful. In addition, proposed paragraph (h)(1)(viii) and (ix) would require that employers train employees on where break areas and employer provided water are located. This would ensure employees are aware of the locations of break areas and water and encourage their effective utilization.

Proposed paragraph (h)(1)(x) would require employers to train employees on the importance of reporting signs and symptoms of heat-related illnesses that they experience personally or those they observe in co-workers. Training employees to be observant of and to report early any signs and symptoms of heat-related illnesses they see at the workplace is a key factor to identifying and addressing potential

heat-related incidents before they result in a serious illness or injury. In addition, employers should ensure that employees are familiar with the employer's own procedures for reporting signs and symptoms of a heat emergency or heat-related illness pursuant to its heat emergency response plan as required in proposed paragraph (g).

Proposed paragraph (h)(1)(xi) would require employers to train employees on all the policies and procedures applicable to the employee's duties, as indicated in the work site's HIIPP. Employees play an important role in effective implementation of the employer's work site-specific policies and procedures to prevent heat-related illnesses and injury, and training on these policies and procedures is necessary to ensure that they are implemented effectively. OSHA recognizes that employees perform various duties and therefore likely need different types of training, and the proposed requirement allows employers flexibility to account for these differences in their training programs. Thus, certain components of the training may need to be tailored to an employee's assigned duties. For example, while all employees would require training on recognizing signs and symptoms of heat-related illness, employees observing a co-worker as part of buddy system under proposed paragraph (f)(3)(i) may require additional training on how to report signs and symptoms according to the policies and procedures established and implemented by the employer. In another example, the individual designated by the employer to ensure that emergency procedures are invoked when appropriate under proposed paragraph (g)(1)(iii) might require more detailed training on the employer's heat emergency response procedures. Another example could be training employees who wear vapor-impermeable clothing on the policies and procedures the employer has implemented to protect them under proposed paragraph (c)(3).

Proposed paragraph (h)(1)(xii) would require employers to train employees on the identity of the heat safety coordinator. Under proposed paragraph (c)(5), the heat safety coordinator would be designated to implement and monitor the HIIPP and would be given authority to ensure compliance with the HIIPP. Therefore, employees could contact the heat safety coordinator to ask questions about the HIIPP, to provide feedback on the policies and procedures, or report possible deficiencies with implementation of the HIIPP. Employers should encourage employees to contact the heat safety coordinator for these reasons. To ensure that employees are able to contact the heat safety coordinator, employers could provide the name of the individual and other information needed to contact them as part of the training required under this paragraph.

Proposed paragraph (h)(1)(xiii) would require employers to train employees on the requirements of this standard. While proposed paragraph (h)(1)(xi) would require training on all policies and procedures applicable to an employee's duties as noted in the employer's HIIPP, training under (h)(1)(xiii) would ensure that employees are familiar with all requirements of this proposed standard. For example, employees would have to be informed of the requirements related to employee participation, including in the development, implementation, review and update of the HIIPP under proposed paragraph (c), and identifying work areas with reasonable expectations of exposures at or above the initial heat trigger, and in developing and updating the monitoring plan under proposed paragraph (d). Employees would also need to be informed that requirements of the proposed standard would be implemented at no cost to employees under proposed paragraph (j). The proposed provision would also ensure that employees are made familiar with the employer's heat-related policies and procedures.

Proposed paragraph (h)(1)(xiv) would require employers to train employees on how to access the work site's HIIPP. If relevant this would include training on how to access both digital or physical copies.

Proposed paragraph (h)(1)(xv) would require employers to train employees on their right to protections under this standard (e.g., rest breaks, water), and that employers are prohibited from discharging or in any manner discriminating against any employee for exercising those rights. Employees' right to be free from retaliation for availing themselves of the protections of the standard or for raising safety concerns comes from section 11(c) of the OSH Act, [29 U.S.C. 660\(c\)](#), and requiring employers to train on these protections is consistent with the purpose of that provision. Proposed paragraph (h)(1)(xv) is also consistent with section 8(c)(1) of the Act, [29 U.S.C. 657\(c\)\(1\)](#), which directs the Secretary to issue regulations requiring employers to keep their employees informed of their protections under the Act and any applicable standards, through posting of notices or “other appropriate means.” This training ensures that employees know that they have a right to the protections required by the standard. Having employers acknowledge and train their employees about their rights under this standard provides assurance that employees are aware of the protections afforded them and encourages them to exercise their rights without fear of reprisal. They may otherwise fear retaliation for utilizing the protections afforded them under the standard or for speaking up about workplace heat hazard concerns. This fear would undermine the effectiveness of the standard because employee participation plays a central role in effectuating the standard's purpose.

Proposed paragraph (h)(1)(xvi) would require that if the employer is required under paragraph (f)(5) to place warning signs for excessively high heat areas, they would be required to train employees on procedures to follow when working in these areas. These procedures could include, but are not limited to, any PPE that might be required when working in those areas, if relevant, and reminders to remove PPE when taking rest breaks in break areas and should reinforce employees' access to rest breaks in break areas, required under paragraph (f)(2), and drinking water, required under paragraph (e)(2), as appropriate.

Proposed paragraph (h)(2) would require the employer to ensure that each supervisor responsible for supervising employees performing any work at or above the initial heat trigger and each heat safety coordinator receives training on, and understands, both the topics outlined in paragraph (h)(1) and the topics outlined in paragraphs (h)(2)(i) and (ii). Proposed paragraph (h)(2)(i) would require the employer to train supervisors and heat safety coordinators on the policies and procedures developed to comply with the applicable requirements of this standard, including the policies and procedures for monitoring heat conditions developed to comply with paragraphs (d)(1) and (d)(3)(ii). Proposed paragraph (h)(2)(ii) would require the employer to train supervisors and heat safety coordinators on procedures they would have to follow if an employee exhibits signs and symptoms of heat related illness, which an employer is required to develop for its HIIPP pursuant to proposed paragraph (g)(1)(vi). This would ensure effective and rapid treatment and care for employees experiencing signs and symptoms of heat-related illness. OSHA included these proposed provisions to ensure that supervisors and heat safety coordinators receive additional training needed to perform their duties as specified in the proposed standard.

Proposed paragraph (h)(3) would require the employer to ensure that each employee receives annual refresher training on, and understands, the subjects addressed in paragraph (h)(1) of the proposed standard. This paragraph would also require that each supervisor and heat safety coordinator additionally receive annual refresher training on, and understands, the topics addressed in paragraph (h)(2). OSHA preliminarily finds that annual training is needed to refresh and reinforce an employee's recollection and knowledge about the topics addressed in this paragraph. This proposed provision also indicates that for employees who perform work outdoors, the employer must conduct the annual refresher training before or at the start of the heat season. This can vary depending on the weather conditions in the geographic region where the employer is located. Accordingly, OSHA intends this requirement to be flexible and to allow employers leeway to determine the start

of the heat season, so long as those determinations are reasonable. For example, in northern States such as Michigan, employers might find it best to do annual training before the time when temperatures commonly reach the initial heat trigger or above. In those cases, temperatures are likely to be below the initial heat trigger for a substantial portion of the year and employees are likely to need reminders of all policies and procedures related to heat, both for the initial and high heat triggers. Employers can determine when heat season is for them based on normal weather patterns and would be required to conduct training prior to or at the start of the heat season. In most instances, OSHA expects that employers would do this no sooner than 30 days before the start of their heat season, so that employees can recall training materials easily, rather than for example, 6-months before the start of heat season. For new employees at outdoor work sites, this may result in some employees receiving the annual refresher training less than a year after the initial training.

Proposed paragraph (h)(4) specifies when supplemental training would be required. Proposed paragraph (h)(4)(i) would require the employer to ensure that employees promptly receive and understand additional training whenever changes occur that affect the employee's exposure to heat at work (e.g., new job tasks, relocation to a different facility or area of a facility). For example, if an employee is assigned to a new task or workstation that exposes them to high process heat or to outdoor work where the employee is exposed to hazardous heat, and such employee was not previously trained on the necessary topics required under this paragraph, then the employer would have to provide that employee with the requisite training. Similarly, if an employee is assigned to a new work area to which different heat-related policies and procedures apply, they would need to be trained on these area-specific policies and procedures. Additional examples could include when an employer's work site experiences heat waves, when new heat sources are added to the workplace, or when employees are assigned to a new task where they need to wear vapor-impermeable PPE (i.e., non-breathable). In these instances, the training required under this provision would have to comport with the requirements of the rest of this paragraph.

Proposed paragraph (h)(4)(ii) would require that each employee promptly receives, and understands, additional training whenever changes occur in policies and procedures addressed in paragraph (h)(1)(xi) of this proposed standard. Proposed paragraph (c) would require employers to monitor their HIIPP to ensure ongoing effectiveness. When doing so, the employer may find that the policies and procedures are inadequate to protect employees from heat hazards. If so, the

employer would have to update those policies and procedures. When this happens, employers would be required to train all employees on the new or altered policies and procedures so that the employees are aware of the new policies and procedures and how to follow them to reduce their risk of developing heat-related illnesses and injuries.

Proposed paragraph (h)(4)(iii) would require that each employee promptly receives, and understands, additional training whenever there is an indication that an employee(s) has not retained the necessary understanding. Examples of this would include employees who appear to have forgotten signs and symptoms of heat-related illnesses or how to respond when an employee is experiencing those signs and symptoms. It is essential that employees remain familiar with training they have received so they continue to have the knowledge and skills needed to protect themselves and possibly co-workers from heat hazards. Supplemental training under paragraph (h)(4)(iii) must be provided to those employees who have demonstrated a lack of understanding or failure to follow the employer's heat policies and procedures or comply with the requirements of this proposed standard.

Proposed paragraph (h)(4)(iv) would require that each employee promptly receives, and understands, additional training whenever a heat-related injury or illness occurs at the work site that results in death, days away from work, medical treatment beyond first aid, or loss of consciousness. Occurrences of these types of heat-related injuries and illnesses could indicate that one or more employees are not following policies and procedures for preventing or responding to heat-related illnesses and injuries. After a heat-related illness or injury in the workplace occurs that meets the requirements of proposed paragraph (h)(4)(iv), OSHA expects that each employee would receive supplemental training. This training could be a “lessons learned” or “alert” type training.

Both initial and supplemental training are important components of an effective heat injury and illness prevention program. Initial training provides employees with the knowledge and skills they need to protect themselves against heat hazards, and also emphasizes the importance of following workplace policies and procedures in the HIIPP. Supplemental training ensures employees continue to have the knowledge and skills they need to protect themselves from heat hazards. It provides an opportunity to present new information that was not available during the initial training or that becomes relevant when an employee's duties change. Additionally, supplemental training is necessary when an employee demonstrates that they have not retained information from the initial training (e.g., by failing to follow

appropriate policies and procedures). Supplemental training does not necessarily need to include all information covered in the initial training, as only some policies or procedures may need to be reviewed, and **employees will receive a full refresher training annually.**

Proposed paragraph (h)(5) would require that all training provided under paragraphs (h)(1) through (4) **is provided in a language and at a literacy level each employee, supervisor, and heat safety coordinator understands.** In addition, the provision would require that the employer provide employees with an opportunity for questions and answers about the training materials. For the training to be effective, **the employer must ensure that it is provided in a manner that the employee is able to understand.** Employees have varying educational levels, literacy, and language skills, and the training must be presented in a language, or languages, and at a level of understanding that accounts for these differences. This may mean, for example, providing materials, instruction, or assistance in Spanish rather than English if the employees being trained are Spanish-speaking and do not understand English. The employer is not required to provide training in the employee's preferred language if the employee understands both languages; **as long as the employee is able to understand the material in the language used, the intent of the proposed standard would be met.** As explained above with respect to paragraph (h)(1), OSHA does not mandate testing or specific modes of ascertaining employee understanding of the training materials, but expects that all required training will include some measure of comprehension.

The proposed provision does not specify the manner in which training would be delivered. Employers may conduct **training in various ways, such as in-person (e.g., classroom instruction or informal discussions during safety meetings/toolbox talks), virtually (e.g., videoconference, recorded video, online training), using written materials, or any combination of those methods.** However, **this paragraph would require the employer to provide an opportunity for employees to ask questions regardless of the medium of training.** It is critical that trainees have the opportunity to ask questions and receive answers if they do not fully understand the material that is presented to them. If it is not possible to have someone present or available during the training, employers could provide the contact information of the individual that employees can contact to answer their questions (e.g., an email or telephone contact). OSHA expects employers to make an effort to respond to questions promptly.