



Work Heat Action Plan

WHAP

A HEAT-DEFENSE PLAN FOR KEEPING WORKERS SAFE AND PRODUCTIVE IN THE HEAT

A guide for employers, enterprises, trade unions and occupational
health professionals

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www.HEAT-SHIELD.eu

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Overview

This document presents issues to consider in preparing protection for people who need to work in hot conditions. Heat waves are becoming more common and more intense in most of Europe. Working people working outdoors are at particular risk, but many workers in workshops, factories and warehouses can also be affected if an effective cooling system is not available. Ongoing climate change will increase the risks.

Additional information and infographics suitable for display inside workplaces, available in several languages; see list at end) can be found on the website:

www.HEAT-SHIELD.eu

Have a plan

Don't be caught off guard! You need to plan for preventive actions during periods of high heat stress in your workplace *before* hot weather occurs. Such an advance plan should include everything you will need in terms of materials, for example refillable coolers or water containers that can provide workers with additional hydration, or provision of ice to provide additional cooling. It is essential to ensure that all employees are familiar with the heat defence plan and know what they should do to take care of themselves and their colleagues during periods of hot weather.

Pay attention to the weather and the local climate

Again, don't be caught off guard! Sign up to a weather notification service that will alert you to an approaching period of hot weather that could affect both your workers' health and productivity. We recommend the Heat-Shield weather notification system (<https://heatshield.zonalab.it/>). In addition to weather notifications, you will also receive recommendations on what defence actions you should take in high heat conditions. Such actions will vary according to the weather, the type of work being undertaken and the clothing workers wear to work. Some protective clothing increases heat risks.

The hazards of excessive heat in workplaces are not only associated with heat waves. In large parts of the world the typical seasonal variations in climate create heat conditions that threaten the health and productivity of working people. You can find user-friendly information about the current and likely future climate in

your location in the Heatshield supported website www.ClimateCHIP.org. The changing climate will increase heat problems in most parts of the world.

The website pops up if you put the word "climatechip" into Google. You can then go to "Your Area" to see the ongoing maximum daily temperature trend in the location of the computer. You can use the search function to find information about a different location. The website has information about different heat variables for each month including the occupational heat stress index WBGT. You can also find trends for future increases in heat based on different climate change models.

Assess the risk

It is important to note that *everyone* is susceptible to heat stress and the related health risks. While older people are at particular risk during heat waves, studies have shown that young healthy men performing physically intense jobs actually suffer the most heat related health problems. It is useful to make a list of all those who might be at extra risk for heat related injuries. Such a list should include older workers, workers with physically demanding jobs, workers who operate in particularly hot areas (e.g. exposed to the sun, works close to hot machinery), new workers who have not experienced occupational heat stress before and workers who have had issues with heat in previous hot periods. During hot weather consideration should be given to assigning these workers to lighter tasks, giving them extra breaks, and checking with them every now and then to make sure they are feeling alright. It is also a good idea to establish a buddy system where workers check in with each other every half hour about how they are feeling.

Give extra breaks

Working in excessive heat slows many types of work activities and reduces hourly productivity. While it may seem counterintuitive, giving workers extra breaks throughout the day may reduce the negative impact of heat on net productivity. Hotter weather means that workers naturally take more unplanned breaks and slow down their work intensity. We recommend that you plan for 2-5 minutes break every 30 minutes, which reduces the number of unplanned breaks and gives workers time to cool down through the use fans, cool water, or other methods (see below). There is an international standard for work/rest time distribution in relation to heat levels (ISO standard 7243, 2017) and certain countries have similar guidance (e.g. NIOSH in the USA, 2016).

Reorganize the work day

An effective way to maintain workers' health and performance in hot periods is to reschedule the workday. This can be done by starting the work day 1 to 2 hours earlier so that the workers are most active during the cooler hours of the day. Work can be rescheduled so that the most physically demanding tasks, (when workers produce the most internal body heat) are carried out during the coolest hours of the day. Lighter tasks can be conducted during the hottest hours of the day. The same approach can be used for both indoor and outdoor work.

Provide hydration

This is probably the most important point of the entire plan. As dehydration intensifies the negative effects of heat on the body, and decreases cognitive performance, which can lead to increased mistakes, accidents and injuries. Chronic dehydration will increase the likelihood of workers developing kidney disorders after long-term daily heat exposure. In particularly hot and sweaty conditions, a worker may sweat as much as 10 litres per work shift of 8-10 hours. It is particularly concerning that many workers arrive at their workplace in a dehydrated state. In hot situations workers should drink additional water before work starts.

During work workers need to be encouraged to drink regularly. This can be helped by reminder posters in common areas, and the provision of multiple water stations at job sites. Outdoor workers can be encouraged to carry hydration backpacks or belts with water bottles so they have constant access to water. In outdoor work sites easily accessible drinking water fill-up stations should be established.

Additionally, in "heavy sweating" situations, simply drinking water may not be sufficient to remain hydrated and protected. It may be necessary to add electrolyte solutions to the drinking water to replace salts lost from the body via the sweat. Affected individuals may also add extra salt to their diet, unless they have heart and blood pressure issues. Extreme heat exposure and work situations of this type will need expertise analysis.

Create "cooling oases"

As stated above, planned rest breaks are essential to maintain worker productivity. The benefits from rest breaks can be optimized by providing cooling oases for workers. Examples include dedicated rooms with air conditioning and cool water, or special areas, distant from hot machinery, can be equipped with electric fans and drinking water. Outdoors, the ideal rest area will have natural air flow and shade. If shade is not available, portable sun canopies and water should be supplied.

Cooling options during breaks

For extra cooling during breaks, several options exist:

Ice slurry ingestion: this can be done by adding shaved ice to drinks. An ice slushy/slurry machine is a good option for making ice readily available. While ice is the most desirable option, simply cooling water has a beneficial effect.

Arm immersion: immersion of the arms into water and ice for 5 minutes has been shown to be a very effective and simple way to effectively and quickly cool a person.

Cooling vests: Cooling vests come in two different forms, either using “phase change” materials or evaporative cooling. Phase change vests contain ice or cooling gel that gradually cools the wearer as they work. These vests are highly effective, however, effective cooling ceases when the ice or cooling gel melts. The vest needs to be changed and freezers need to be close by to re-cool the vests. Evaporative cooling vests need to be wet and cool the wearer as the water evaporates. However, while these vests are less of a logistical challenge, they are not effective in high humidity environments. There are new types of clothing coming onto the market that have personal fan units incorporated into them.

Ice towels: This method is a cheaper alternative to cooling vests. Towels are wetted and filled with ice. This can be a good solution during short periods with very high heat stress for cooling workers down during rest breaks. They can also be used in emergency situations when there is an acute need to lower skin temperature. If used over a prolonged period, they can lower deep core temperature as well.

Stationary Ventilation with fans: Increasing air flow across the skin enhances the body’s natural heat loss processes, namely sweating. If the skin is wetted with a spray, cloth, or sponge, extra evaporative cooling occurs in addition to sweating.

Optimize clothing

A very effective way to improve worker comfort, health and performance in the heat is to ensure they are wearing appropriate clothing for the conditions. Clothing worn in hot conditions should be light, loose, and made of breathable fibres and textures to maximise the passage of air across the skin surface. Outdoors workers should wear long pants, long-sleeved shirts and hats to protect their skin against solar radiation. Lighter coloured clothing also helps to reflect solar radiation. Indoors workers are advised to wear light, loose clothing that exposes as much skin as possible to facilitate heat loss. For those working in industries requiring the use of heavier protective clothing, it is advisable to wear garments with mesh incorporated over areas such as the armpits, groin, elbows and back of the knees.

Signs and symptoms of heat illness

It is important for management and workers to be aware of the signs and symptoms of heat illness. These include:

Early symptoms

- Tiredness
- Weakness
- Dizziness
- Headache
- Muscle Cramps

More severe symptoms

- Cessation of sweating
- Breathing: fast and shallow
- Confusion
- Nausea or vomiting
- Fainting
- Skin: may be cool and moist
- Paleness
- Pulse rate: fast and weak

Treating heat illness

In the event of workers experiencing symptoms of heat illness, you should:

1. Move them to a cool area out of the sun
2. Loosen their clothing and sit them down to rest
3. Give them cool water to drink
4. Apply cool water to their skin

If a worker loses consciousness, call emergency medical services immediately. In the interim, apply whatever cooling is available, e.g. wetting the skin, applying ice to the body, particularly around the head and neck, and immersing the person in a tub of cool water if one is available.

It is important also to keep records of any occurrence of symptoms like these or heat impacts on worker discomfort or productivity loss to enable detailed analysis of improved prevention methods. Reports of this kind will also improve projections of future heat impacts as climate change progresses.

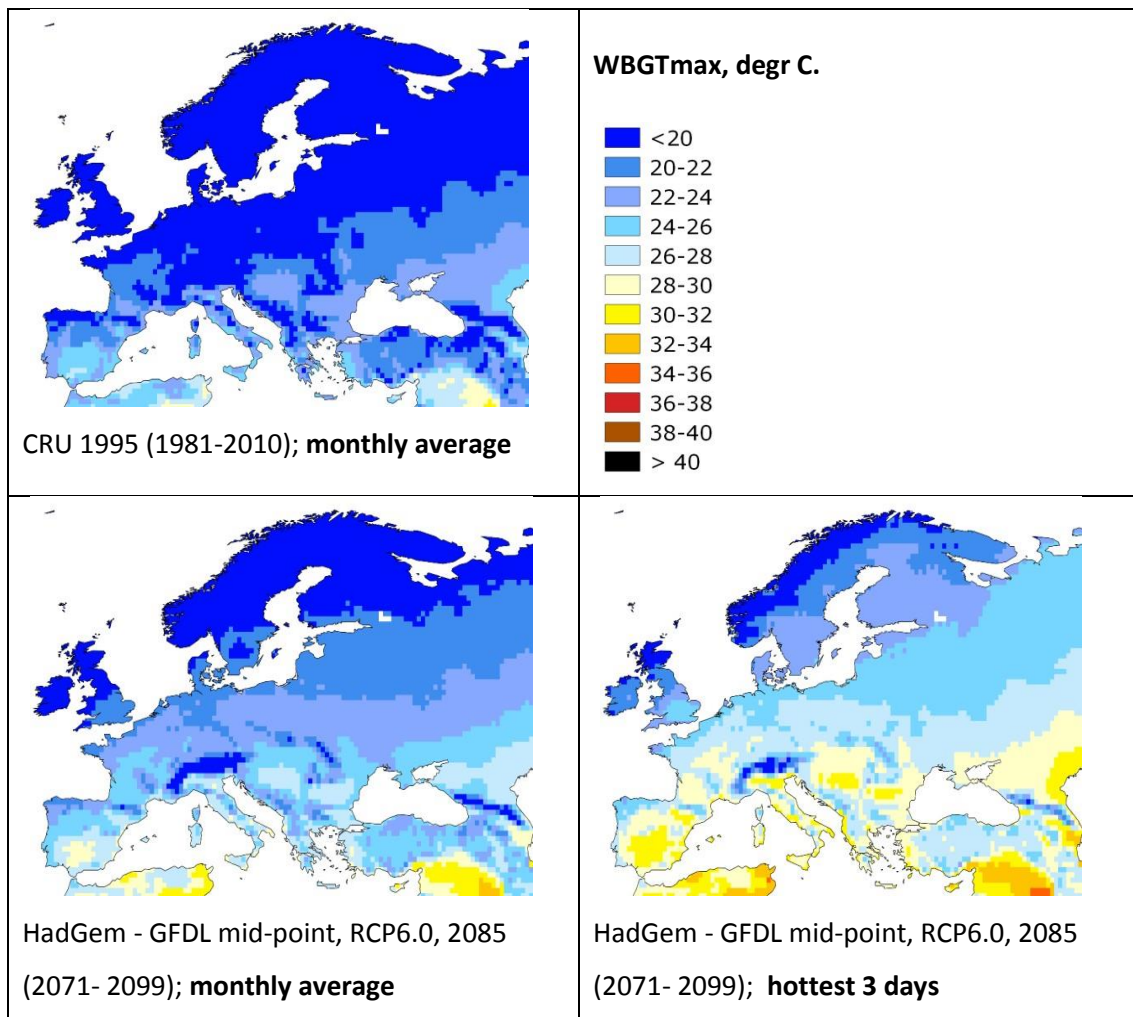
Climate change consequences

An important current concern is the ongoing and future climate change and the consequences for a variety of workplaces as heat conditions worsen. The environmental heat levels will certainly increase and the likely developments in Europe are shown in the Figure below. WBGT (Wet Bulb Globe Temperature) is a commonly used occupational heat stress index. When the hourly levels exceed 26°C, physically intense work, such as in construction and agriculture, health and productivity is adversely affected. The figure shows monthly averages of daily maximum WBGT levels in the shade. Working in the sun during the middle of the day would add 2-3°C to these levels. The hottest days in a typical hot month would have levels 2-3°C higher, but serious heat waves can bring much higher levels.

Protection of working people from excessive heat with plans as outlined above will become more and more important in large parts of Europe. In addition, enterprises and communities need to take actions to reduce the actual climate change. This means reducing the emissions of greenhouse gases and local actions include the following:

- production and use of electricity from renewable sources (e.g. solar panels on factory roofs; solar driven air conditioning systems on roofs);
- reduction of energy waste in production processes and in heating or cooling systems in workplace buildings;
- limiting travel needs for staff: work from home; hold on-line virtual staff meetings; encourage the use of public or active transport (bicycling or walking) for essential work travel or commuting;
- implementation of operational changes that limit production of greenhouse gases in the workplace processes.

Figure. Regional distribution of afternoon heat levels (hourly) in Europe during the hottest month; recent years and end of century values; WBGT heat index levels in the shade (from Kjellstrom et al., 2018. Int. J Biometeorology).



Further questions?

For more information on these and other ways to heat-proof your workplace, visit www.heat-shield.eu or contact consult@heat-shield.eu for free guidance on heat-health actions for your workplace. The website has copies of the infographics and can be printed for local use (in “Public Guidance” section. Languages available: English, French, German, Greek, Italian, Dutch, Portuguese, Slovenian, Spanish, Swedish)

Country specific information and heat protection standards and recommendations, in local language, can also be sought on the internet.