
Executive summary

Health Council of the Netherlands. Heat stress in the workplace. The Hague: Health Council of the Netherlands, 2008; publication no. 2008/24.

The request for advice

In the present report, at the request of the Minister of Social Affairs and Employment, the Health Council of the Netherlands has investigated whether at the present time there are any new scientific insights concerning health-based and safety-based limit values for heat stress in the workplace, and whether any such insights can be expected in due course. This report is the first in a series of reports examining occupational risks covered by the Working Conditions Act and its associated regulations. In order to be able to answer the Minister's questions, the Committee studied scientific data on the adverse short-term and long-term effects of heat stress. In this report, the Committee makes no proposals concerning the level of a limit value.

Heat stress in the workplace

Heat stress in the workplace is not simply a question of ambient temperature. An equally important factor is the degree of effort associated with the work in question, since this can result in the production of considerable amounts of body heat. Can such body heat easily be dissipated to the immediate environment, or is this process impeded by clothing? In addition, the response to heat stress varies from one person to another. At the individual level, acclimatisation and fitness are the main factors that reduce an employee's susceptibility to heat stress.

Limit values and the effects of heat stress

The Netherlands has no statutory limit values for heat stress. There is a set of reference values, however, which is used for the purpose of compliance. These are described in NEN-ISO 7243: 1989. At international level, the most widely known limit values are those that were recommended by the American National Institute for Occupational Safety and Health (NIOSH). Both the NIOSH-values and the reference values are based on the prevention of acute heat illnesses (such as heat exhaustion and heat-stroke), which involves using body core temperature as an indicator.

A survey of the scientific literature reveals that research into heat stress has mainly focused on its adverse short-term physical effects. The bulk of these studies were carried out under controlled conditions. The amount of research data relating to realistic work situations is very limited indeed.

Results from more recent scientific research show that heat stress also causes adverse short-term mental effects. Reduced vigilance and poorer performance in terms of other mental functions were observed at environmental heat levels at which there was still no indication of adverse physical effects. The scientific literature indicates that heat stress results in an increased incidence of unsafe acts and a greater risk of accidents. In work situations, effects of this kind can endanger the health of an individual or that of others.

Conclusions and recommendations in relation to limit values

Reference values for the adverse short-term physical effects of heat stress do not need to be reviewed

The Committee concludes that, at the present time, there are no new scientific insights concerning the adverse short-term physical effects of heat stress. There is, therefore, no reason to review existing health-based limit values, such as the NEN-ISO reference values.

Reference values do not take adverse short-term mental effects into account

The reasoning which underpins the reference values and limit values recommended by NIOSH makes no allowance for any adverse short-term mental effects of heat stress. The Committee takes the view that current scientific knowledge

appears to offer sufficient opportunities for the establishment of safety-based limit values for heat stress.

There is insufficient data about the long-term effects of heat stress

Too few studies have been conducted on the adverse long-term physical and mental effects of heat stress. The Committee takes the view that current scientific knowledge on long-term effects is not an adequate basis for health-based or safety-based limit values.