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Ergonomics of the thermal environment — Analytical determination and interpretation of heat stress using calculation of the predicted heat strain

Ergonomie des ambiances thermiques — Détermination analytique et interprétation de la contrainte thermique fondées sur le calcul de l'astreinte thermique prévisible

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Contents

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 5, *Ergonomics of the physical environment*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 122, *Ergonomics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 7933:2004), which has been technically revised.

The main changes are as follows:

— The maximum sweat rate S_{Wmax} described in B.4 has been corrected, i.e. it is no longer adjusted for metabolic rate.

— As the model has not been extensively validated for conditions with unsteady environmental parameters, metabolic rate and/or clothing, a caution has been added for cases where these parameters vary substantially with time.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

ISO 15265 describes the assessment strategy for the prevention of discomfort or health effects in any thermal working condition, while ISO 8025[1)] recommends specific practices concerning hot working environments. For these hot environments, these standards propose relying on the wet bulb globe temperature (WBGT) heat stress index described in ISO 7243 as a screening method for establishing the presence or absence of heat stress, and on the more elaborate method presented in this document, to make a more accurate estimation of stress, to determine the allowable durations of work in these conditions and to optimize the methods of protection. This method, based on an analysis of the heat exchange between a person and the environment, is intended to be used directly when it is desirable to carry out a detailed analysis of working conditions in heat.

This document makes it possible to predict the evolution of a few physiological parameters (skin and rectal temperatures, as well as sweat rate) over time for a person working in a hot environment. This prediction is made according to the climatic parameters, the energy expenditure of the person and his or her clothing. This prediction is made for an average person and should be used to assess the risk of heat stress for a group of people; it cannot predict a particular person's responses.

This document is based on the latest scientific information. Future improvements concerning the calculation of the different terms of the heat balance equation or its interpretation will be taken into account when they become available.

Occupational health specialists are responsible for evaluating the risk encountered by a given individual, taking into consideration their specific characteristics that can differ from those of a standard person. ISO 9886 describes how physiological parameters are used to monitor the physiological behaviour of a particular person and ISO 12894 describes how medical supervision is organized.

1) Under preparation. Stage at the time of publication: ISO/DIS 8025:2023.