Protective Clothing and Heat Stress: Introduction

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This issue presents the main papers from a meeting of the Clothing Science Group in June 1998, called to consider the then draft BSI standard on ‘Ergonomics of the thermal environment—Guide to the assessment of heat strain of workers wearing personal protective equipment’. The aim of the meeting was to bring together experts from the UK and overseas to discuss the thermal aspects of wearing protective clothing and equipment and to provide a forum for discussion of the draft standard.

In the UK and many European countries there is now a legal requirement to assess any risks that may be associated with the wearing of personal protective clothing and equipment (PPE). One risk is that the prevention of heat loss from the body may lead to injury and death from hyperthermia. The draft standard aims to provide information relevant to assessing this risk. Also of considerable importance is the economic cost of heat stress imposed by PPE and the degrading of work quality and performance.

Once the body begins to store heat, incapacitation and fatal changes can be minutes away. Awareness of, and constant alertness for, the factors that can cause heat illness are therefore vital to everyone who is at risk. Frequently, the signs of heat illness—nausea, irritability, sluggishness, pallor, lack of sweating—are misunderstood, with fatal consequences. Examples are documented of heat-illness fatalities in the US and UK armed services, in industry and in sport (50 US football players are said to have died of heat illness in the 10 years to 1975).

It is usually thought that heat strain occurs only in warm or hot conditions. This is wrong. Any heat generated by working which cannot escape because protective clothing is being worn, is stored in the body, and as a consequence the body temperature rises. Heat strain therefore occurs whenever the body generates more heat than it can lose—even in cold conditions. A British soldier marching in outdoor temperatures close to 12°C died of heat-related illness.

The papers presented in this special issue deal with a number of aspects of the thermal environment relevant to the assessment of the hazards and risks associated with the wearing of PPE.
They should assist the user of PPE to comply with legal duties of risk assessment and also to gain some control of the risks, preferably without using the very expensive option of rest pauses. However, it is clear that much more information is required on control, particularly the role of convective cooling of clothed people, the use of wetted clothing and clothing designs which enable air to penetrate to remove heat from the clothing micro-environment.

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