Annals Physiol. Anthrop. Vol 5. No. 3 1986

12 Descrlption and evaluation of equipment for protection from hot environments: An overview

SA. Nunneley, USAF School of Aerospace Medicine. San Antonio. Texas USA

Heat stress arises forn some combination of environment, work rate and clothing -the latter often required for protection from nonthermal hazards. Equipment to alleviate unacceptable heat stress can take various forms. which may be divided into two basic types: 1) Passive – primarily useful where external heat load predominates: examples are thin clothing to prevent insulation while allowing airflow, reflective and/or insulating layers to exclude extreme environmental heat, and a wetable external cover to cool the outer surface of clothing; 2) Active - the microclimate is controlled by means of ventilated or liquid-cooled clothing. Air systems may use ambient, dehumidified or cooled air; problems include providing the necessary volume of air and distributing it within the clothing. Liquid conditioning has several engineering advantages and can provide much stronger cooling. Ether type of microclimate control requires an external heat sink whose action may be used continuously (man-mounting or tethering) or intermittently (tethering only during rest breaks). Optimal selection of thermal protective equipment requires analysis of the cases of the problem, determination of possible cooling options, and selection of the best alternative for the particular setting. This evaluation process requires expertise form a variety of disciplines and may include Manikin testing, computer modeling, laboratory experiments and field trials.