

INFLUENCE OF ENVIRONMENTAL CONDITIONS ON MASK MICROCLIMATE AND SUBJECTIVE PERCEPTION OF DIFFERENT MASK TYPES FOR PROTECTION AGAINST SARS-COV-2

E.M. Marek, V.v Kampen, B.Jettkant, B. Kendzia, B. Strauß, M. Ulbrich, A. Deckert, H. Berresheim, F. Hoffmeyer, C. Eisenhawer, S. Weidhaas, T. Brüning, and J. Bünger

Institute for Prevention and Occupational Medicine of the German Social Accident Insurance
Institute of the Ruhr University Bochum (IPA), Deutsche Gesetzliche Unfallversicherung e.V. (DGUV)

Wearing masks under physical work may lead to complaints of labored breathing especially depending on the season. Therefore, mask microclimate and subjective impairment caused by wearing face masks were investigated under different environmental conditions.

Methods: 18 participants (48 years (range: 19-65), were tested for 20 minutes with surgical mask (SM), community mask (CM) or FFP2 respirator (FFP2) and without mask at light exercise under three environmental conditions (cold/normal/warm). The climate behind the mask and physiological parameter were recorded continuously and questionnaires were performed before and after exercise.

Results: Ambient temperatures ranged between -8°C (cold), 22°C (normal) and 32°C (warm). Temperature behind the mask increased with increasing outdoor temperature (cold: 24-28°C, normal: 32-33°C, warm: 34-35°C), while relative humidity was lowest at normal conditions. This effect was most pronounced with FFP2. The perceived impairment was most pronounced under warm conditions for all mask types, whereas comfort was significantly reduced. The feeling of humidity and heat was highest at warm conditions.

Conclusions: Participants subjectively described a feeling of heat and humidity which varied according to the ambient temperature. The FFP2 caused the strongest effects on all investigated parameters.