

ISRP 1999 abstract

Presenter/author	Title	Abstract
Gardner, Paul D. Caretti, M. D. <i>U.S. Army Edgewood Chemical Biological Center 5183 Blackhawk Road Aberdeen Proving Ground, MD 21010-5424 USA</i>	Assessment of Respirator Fit during Exercise in A Hot Environment	<p>A study was conducted to assess the effect of exercise under controlled environmental conditions of high temperature and humidity on the face seal fit of negative pressure respirators. Three different full-facepiece respirators having key design features of interest were evaluated. Respirator fit factor (FF) data were obtained using a portable condensation nuclei counter quantitative fit testing device to measure ambient aerosol leakage inside the facepiece. Overall FFs were determined before, during, and after a 60-minute treadmill walk performed by 17 subjects at an intensity of 75% of age-predicted maximal heart rate in an environmental chamber maintained at 30°C and 85% RH. Pre-exercise and post-exercise FFs were measured using a fit test protocol consisting of 10 one-minute exercises. Subject facial and whole body sweat production was also measured. The amount of sweat within one of the respirator face pieces was found to be significantly ($p>0.05$) less when compared to the others. Statistical analysis of the pre-exercise and post-exercise FF results showed that the fit of each respirator was significantly ($p>0.05$) degraded over the course of the exercise period. No significant differences in FFs were observed between the three respirators at any time. Although not statistically significant, other findings suggest that specific design features of the different respirators may play a role in lessening the potential for leakage due to facepiece slippage as a result of sweating. Additional analyses of the FF results will be summarized and the implications of these findings for respirator design will be discussed.</p>