

Evaluation of Respirator Fit Testing Protocols- A practical approach

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Tight-fitting Respiratory Protective Devices (RPDs) have a mandatory requirement to fit test end-users to ensure an adequate seal can be achieved between the wearer's face and the RPD. Various countries have adopted (eg UK and USA) or are considering adopting a level of fit test requirement in their regulations. In the examples of the UK and USA, the regulatory requirements are covered in HSE OC 282.28 and OSHA 29CFR 1910.134 respectively.

Although the concept of fit testing is fundamentally the same, there are differences in the protocols used in the two countries. Of the various accepted methods that can be employed to test the fit of a respirator, the quantitative fit test method using a Portacount (TSI) was chosen as particularly suitable and convenient for this study. With the differences in protocols in mind, a practical assessment of various set-up procedures was assessed for their likely impact on a respirator's fit result. This paper will focus on disposable respirators and quantitative fit testing, examining; a) the impact of exercising during the fit test. The HSE regulations specify walking, stepping or cycling whereas the OSHA regulations specify that the subjects stand.

Previous reports have investigated the effect of head exercises and time of exercise on fit, whilst the practical elements and increased work rate from exercise have had less focus. Previous studies have also investigated the effect of pressure/air flow on faceseal leakage (fit). Whilst this study takes a practical approach; the level of increased breathing rate expected from exercising can be compared to the findings of these studies.

b) the use of the N95 companion for FFP3 products. The HSE specifies the use of the N95 companion for FFP1 and FFP2 products, whilst FFP3 should be tested without the companion. Previous studies have also applied correction factors for the filter penetration portion of inward leakage as an alternative method to gain a fit factor from systems that do not distinguish between faceseal leakage and filter penetration. These values can be compared to the practical results of testing an FFP3 respirator with and without the N95 companion in the fit test setup.

The statistical methods employed for analysing the results and differences in pass/fail criteria are also considered.