

POF018: General platform presentation

Recommended Test Methods and Pass/Fail Criteria for a Respirator Fit Capability Test of Half-Mask Air-Purifying Respirators.

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Abstract:

This study was conducted to determine key test parameters and pass/fail criteria options for developing a respirator fit capability (RFC) test for half-mask air-purifying particulate respirators. Using a 25subject test panel, benchmark RFC test data were collected for 101 respirator models, all certified by the National Institute for Occupational Safety and Health.

These models were further grouped into 61 one-, two- or three-size families. Fit testing was done using a PortaCount® Plus with the N95-Companion accessory and an Occupational Safety and Health Administration accepted quantitative fit test protocol. Three repeated tests (donnings) per subject/respirator model combination were performed. The RFC (number or percentage of the 25 subject panel achieving acceptable fit) was determined for each model using four different methods for determining acceptable fit.

The percentages of the 101 models capable of fitting > 75% (19/25 subjects) of the panel were 29% and 32% for subjects achieving a fit factor ≥ 100 for at least one of the first two donnings and at least one of three donnings. Using > 75% of panel achieving a fit factor ≥ 100 for at least one of two donnings as the RFC pass/fail criterion, 33% of all 61 families can pass. When > 50% (13/25 subjects) of panel were the criterion, the percentage of passing families increased to 59%.

Testing respirators grouped into families using two donnings for each of two respirator sizes provided the best balance between meeting end user expectations and creating a performance bar for manufacturers. Specifying that a subject achieve a fit factor ≥ 100 on at least one out of the two donnings was the most appropriate method for determining accepting fit. A majority of existing respirator families can achieve an RFC of > 50%. These methods and criteria can be considered by standards development organizations.