



NIOSH ON FIT TESTING

WHAT YOU NEED TO KNOW

OHD would like to provide some clarification on the National Institute of Occupational Safety and Health's (NIOSH's) stance on respirator fit testing. The need for this stems from "incorrectly stated" information¹ continuing to be provided by ambient aerosol (AA) fit test machine manufacturers citing a series of studies performed at NIOSH^{2,3,4}. The phrase "incorrectly stated"⁵ is a direct quote from the Chief of Staff of NIOSH, Mr. Frank Hearl, in his response to OHD dated November 25th, 2019 after his review of the ambient aerosol literature claiming NIOSH's stance¹. This misinformation causes confusion in the market. It is misleading and factually incorrect.

The AA literature¹ leaves out significant details and misrepresents the results. These studies^{2,3,4} were meant to establish if quantitative fit test methods could be used in a laboratory for research on simulated workplace test exposures. There are foundational problems with the models used in these studies as applied to the real world. It is also important to note that these studies were not meant to determine or establish the superiority of one quantitative fit testing method over another for any actual respirator fit testing. The lead researcher and author of the study, Dr. Christopher Coffey, provided the following quote⁶ in correspondence to OHD dated April 22, 2013:

“*My manuscript states in the last line of the abstract, “This study suggests some QNFT methods may be used to estimate actual respirator performance under laboratory conditions (emphasis added).” One of the contributing factors to the CNP’s lower r2 value was that there was a redonning of the respirator between the end of the Freon test and the CNP test. The other tests were done concurrently with the Freon test or after without a redon. NIOSH has not made any recommendations or statements regarding whether one quantitative fit test is better than another in the field. OSHA’s 1910.134 regulation lists CNP along with generated and ambient aerosol as acceptable quantitative fit test methods. NIOSH has not found any problems to these tests.*”

This comment from the author is supported by the study's limitation section where it states:

**Continued on Page 2*

“The subject had to take off the respirator and redon it prior to the CNP test being performed. Even though every effort was made to put the respirator on exactly the same, the fit for the CNP test may not have been exactly the same as it was when the subject was exposed to the Freon-113. This placed the CNP method at a disadvantage not shared by the other fit-test methods. The random variation introduced by having to remove and redon the respirator may have tended to mask the correlation between exposures and fit-test results.”

The key point is that CNP was treated differently and placed at a disadvantage according to the author and the limitation section of the paper. NIOSH does have an official stance on respirator fit test methods. According to the Chief of Staff's letter⁵, the official stance comes from the document "Comments to OSHA on the Proposed Rule on Respiratory Protection CFR Parts 1910, 1915 and 1926, Docket No. H-049"⁸ where it states the following:

"NIOSH does not agree with the proposal to establish one test method as the standard against which other fit tests are to be judged. The fit test proposed by OSHA as the reference standard [generated aerosol] has not itself been validated"

It goes on to say:

"Only the controlled negative pressure fit test system has been subjected to limited validation"

These comments are also in line with a letter from NIOSH's Assistant Branch Chief, Donald Cambell,⁹ to OSHA from 1993 in response to CNP not correlating to fit test methods that sample aerosol from the respirator face-piece [AA].

"It seems that both NIOSH and OSHA share a common dilemma concerning respirator fit testing. The long accepted quantitative fit test relying on in-facepiece sampling has come into question and, in hindsight, does not seem to have been based on sound scientific reasoning."

The letter further states:

“The validation study by Crutchfield¹⁰ is, of course, a limited study: however, it is the only such study to validate any fit-test procedure. Thus, of the two basic types of Quantitative fit tests, the CNP fit test is the most scientifically defensible.”

After reviewing these letters^{5,9}, comments⁸, and the studies themselves^{2,3,4}, it is clear that NIOSH's official stance on fit testing is that CNP technology is the only technology having received any level of validation and aerosol technology has never been validated. NIOSH also makes no stance on one method being above another. CNP and Aerosol methods are both compliant methods.





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