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Update on the ASTM International Standard Test Method for Respirator Fit Capability

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In observance of the 100th anniversary of the publication of the U.S. Bureau of Mines first respirator approval schedule, NIOSH published, "The Respirator Fit Capability Test: Enhancing the Efficacy of Filtering Facepeice Respirators", in the digital supplement to the September 2019 issue of the Synergist. In the article, we described the development of a new voluntary ASTM International standard designed to help ensure negative-pressure half-facepiece particulate respirators fit a percentage of wearers.[1] The purpose of this article is to provide an update on the status of this standard.

As stated in the September article, the draft standard was first balloted in April 2019 by the ASTM F23.65 subcommittee on Respriatory.[1] There were three negative votes. Based on the input received during the June 2019 subcommittee meeting, the draft standard was revised and all comments were addressed. A second ballot occurred in April 2020 resulting in two negative and three affirmative with comment balllots. The negative comments were in regards to the passing rate being too low, the test chamber variables, the in-facepeice probe placement, the ability of other types of personal protective equipment (e.g., safety glasses) to affect the fit of the respirator, what needs to be said during the talking exercise, posting of the passing fit factor, and using the NIOSH Bivariate Panel. The comments received with the affirmative ballots were about formatting, providing examples of probed elastomeric facepieces, and providing specific makes and models as examples of the equipment needed to conduct the testing.

The F23.65 subcommittee found all the comments associated with the negative ballots to be non-persuasive. The ASTM Committee on Standards (COS) received an official appeal challenging this determination. The COS reviewed all available information denied the appeal. On October 13, 2020, the ASTM F3407 – 20 Standard Test Method for Respirator Fit Capability for Negative-Pressure Half-Facepiece Particulate Respirators was published. It is available for purchase at https://www.astm.org/Standards/F3407.htm. The only differences

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between the draft described in the September 2019 article and the final standard are editorial. NIOSH is designing a study to determine the precision of the method and the necessity of having the grimace exercise. NIOSH plans to complete the study within the next three years.

The ASTM F3407 – 20 Standard will enable respirator manufacturers to develop better designed models that fit a greater portion of the worker population. Respirators passing the RFC standard are expected to have better fitting characteristics (i.e., respirator models will fit more people and wearers will be able to find an adequately fitting respirator with fewer fit tests). The standard will lower costs to respiratory protection programs since one respirator model is expected to adequately fit more workers in the program. Conformity assessment program owners such as NIOSH will be able to use the RFC standard to evaluate conventional respirator designs as well as novel ones. An example of a novel design is a respirator that does not include the typical use of a head harness (i.e., two straps to provide adequate tension during use and even distribution of pressure over the entire area in contact with the face). Assessment based on the RFC standard could ensure the novel head harness design provides adequate tension during use and even distribution of pressure over the entire area in contact with the face.

In conclusion, this standard defines performance requirements that could be used as part of a conformity assessment program to ensure certified respirators/families of respirators capable of fitting a specified percentage of their intended user population, which will provide workers with better protection. This is critical in all industries where workers are exposed to a variety of agents (particles) and is critically important as new designers and manufacturers begin to make respirators. In the health care industry this is vitally important during a global pandemic which puts frontline workers at significant risk of infection. It is not only important that adequate protection be provided through properly fitting respirators, but that they are worn by health care workers when potential exposures exist.

Reference:

1. ASTM International. 2020. Standard test method for respirator fit capability for negative-pressure half-facepiece particulate respirators. West Conshohocken (PA). (ASTM F3407–20). [accessed 2021 Sep 23]. https://www.astm.org/Standards/F3407.htm.