



A Global Collaboration Forum for Personal Protective Equipment (PPE)



Q: For 3-ply surgical masks, when will the ASTM standard be revised to allow direct use of the 8130A using salt spheres (versus latex spheres - without the need for using conversion factors)?

A: The F23.40 subcommittee is in the process of balloting changes to use a sodium chloride test as a replacement for ASTM F2299 that uses latex spheres. This change is expected to be adopted later this year.

Q: Apart from testing for initial PFE, what emphasis is being made for testing PFE over a period of time? Example, mask re-use efficiencies, multi-hour wear in terms of shortage. Static Charge decreases in melt-blown masks with the introduction of aspirated moisture, reducing mask efficiency?

A: ASTM F3502 already includes requirements for evaluating reusable barrier face coverings after the maximum number of cleaning cycles as specified by the manufacturer. For other types of masks, there are no current requirements for assessing performance following use or cleaning.

Q: Our paper in PNAS finds similar results <https://www.pnas.org/doi/full/10.1073/pnas.2110117118>

A: Thank you for the reference to your article. This is an outstanding scientific source of definitive information for showing mask effectiveness.

Q: Working in healthcare, I see people double masking, what impact would that have on breathability and filtration efficiency?

A: Double masking has been principally recommended to overcome the lack of fit for products on the individual's face in creating an adequate seal. The use of a second mask is intended to improve that fit. While this practice can improve filtration efficiency by providing an additional layer, it also results in increased airflow resistance, which can negate the possible improvement of faceseal depending on the types of masks involved.

Q: Do you think the ISO headforms represent the nose region adequately? Presumably this is the most critical area for mask fit, yet the variation might disappear into noise as the dimensions are smaller than the whole face.

A: The ISO 16900 headforms were expressly designed to assess facepiece fit on individual faces, including half masks. While a detailed analysis of all relevant facial dimensions has not been made, these headforms are expected to provide a reasonable representation of individual faces for testing purposes.

Q: What about a leakage ratio and how can be calculated?

A: Currently leakage ratios can be calculated using the outside and inside concentration when measuring using fit testing. The most common approach is to use fit testing as currently conducted for respirators, which relies on sampling particulate levels both outside and inside the mask and calculating a protection or fit factor. This information can then be represented as a leakage factor.

Q: Can you share the ISO headform reference standard number?

A: ISO 16900-5: 2016, Respiratory protective devices — Methods of test and test equipment — Part 5: Breathing machine, metabolic simulator, RPD headforms and torso, tools and verification tools

Q: What is being done on the supply side for BFC?

A: Several organizations are weighing the utility of barrier face coverings, particularly as more emphasis has been put into higher quality filtration and fitting masks. In the United States, the CDC has reviewed BFCs that are positioned against ASTM F3502. Those products appear at:

<https://www.cdc.gov/PPEInfo/RG/FaceCoverings>

CDC has also indicated supplemental specifications for these products at:

<https://www.cdc.gov/niosh/topics/emres/pandemic/>

Q: During BFE testing, which side of the N95 mask is tested?

A: ASTM F2101 does not specify the direction of the material for purposes of PFE testing; however, most manufacturers test the material layers in their products with the inner layer towards the challenge of bacterial aerosol.

Q: Have you tested any FFP3 mask?

A: No products directly positioned against EN 149 had been tested to date as part of the presentation information provided by North Carolina State University.

Q: Among the presenters, mostly males, it seemed that more than half are bearded. How does this personal choice figure into the F3502 standard test?

A: It is well established that beards interfere with the fit of the seal of a mask (respirator, medical mask, or face covering) on an individual's face. The BFC standard does not indicate limitations for persons with beards, but this is generally a limitation that can be identified in the user instructions for these products. For respirators, this issue is handled by the specific fit testing of individuals with specific products.

Q: Did you also test how beards affect the mask efficiency?

A: No assessment has been made with beards with the testing that has been performed to date at North Carolina State University.

Q: How did you fit the haptics of the skin at the nose to face part of the head

A: Most headforms use a smooth surface that often does not represent the textures, elasticity, and other features of human skin. The new manikin system that North Carolina State University is using has a softened outlayer layer that attempts to replicate some skin features but obviously cannot represent the full range of different characteristics that may exist for different individuals.