

FIT TESTING HEALTHCARE PROFESSIONALS CAN TRUST

BY MOLLY DORAN, JOHN MORTON
AND GREG OLSON



Introduction

As a Healthcare Professional:

- + Do you know what to do in the event of a contagious disease outbreak?
- + Does your workplace have a plan for and provide you with the assurance you'll be safe while at work during such an outbreak?
- + What can you do to ensure your safety, your family's safety and to protect against the spread of disease within the general population?

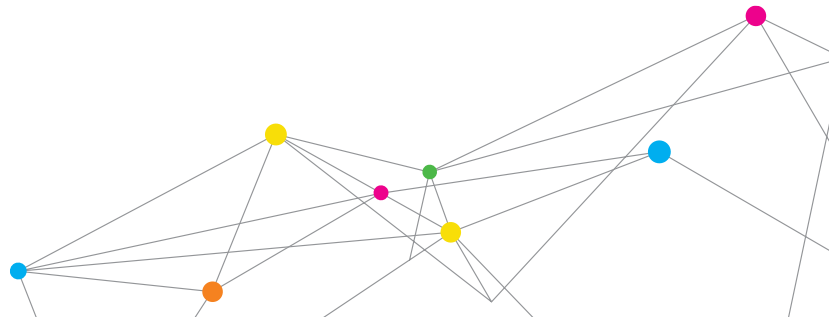
These are important questions to ask as a healthcare professional. Respiratory protection preparedness can be the most important step in the protection of workers from contagious diseases, from a worldwide pandemic or community influenza outbreak in addition to patients with an infectious disease.

The delivery of healthcare services can encompass a broad range of workers and a variety of workplace settings with different levels of occupational exposure to infectious agents. These include:

- + Hospital personnel (physicians, nurses, technicians, clinical laboratory workers)
- + First responders (EMTs, Paramedics, firefighters and police)
- + Nursing care facilities (physicians, nurses and caregivers)
- + Outpatient clinics (medical and occupational health)



UNDERSTANDING, ACCELERATED



FIT TESTING

HEALTH PROFESSIONALS CAN TRUST

Why Fit Test

Working in any of these healthcare settings, workers are susceptible to airborne transmission through aerosolized particles/droplets that contain infectious agents, many remaining suspended in the air for extended periods of time. The infectious aerosols are generated when an infected person coughs, sneezes, or talks as well as during certain medical procedures, such as suctioning or endotracheal intubation. Transmission or spread occurs when these aerosols are inhaled and/or come into direct contact with the surface of the hands, eyes, nose or mouth.

Proper implementation of an organization-wide Respiratory Protection Program (RPP) is a huge undertaking but is the most important factor in keeping healthcare workers safe while on the job. Worth the effort, an effective Respiratory Protection Program is essential in order to meet compliance of strict Federal standards and healthcare industry directives (i.e., OSHA and JCAHO) and instill trust in healthcare workers that their respirators work.

Know You're Protected

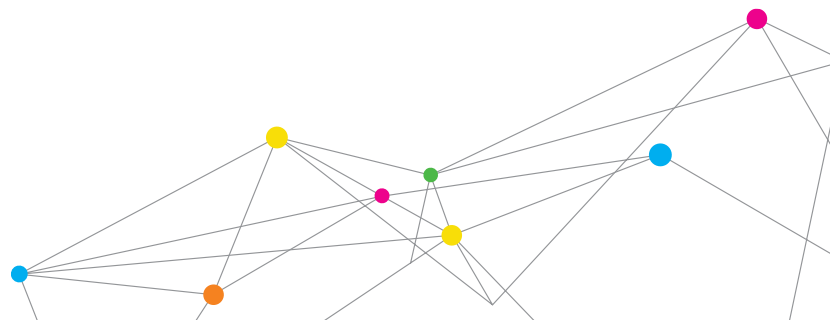
Respirators come in various types, models and sizes. Most important, a respirator must be selected to provide the best face fit and seal. A proper seal inhibits the flow of air between the user's face and respirator's sealing surface in turn ensuring inhaled air passes through the respirator's filter material to maximize worker protection. To safeguard a proper seal, it is very important that the wearer knows how to properly don (put on) and wear the respirator. Employing a respirator fit test is the only way to determine if it is being worn correctly and providing optimal fit and rated level of respiratory protection.

At minimum, OSHA requires that respirator fit testing occurs on an annual basis. However, fit testing must occur in other notable instances as well. This includes when an organization changes to a different respirator model or if a person experiences facial changes of any kind, possibly due to significant weight loss, etc.

The most common type of respirators used in healthcare settings are N95 filtering facepiece respirators. The N95 respirator is different from a surgical mask in that it contains filtering media, which reduces healthcare staff exposure to airborne contaminants by way of filtering the air through the mask filter material. Surgical masks merely provide a physical barrier in order to catch bacteria exhaled or expelled in liquid droplets and aerosols from the wearers mouth and nose. In other words, they are designed to protect the patient not the healthcare practitioner (wearer), whereas N95 respirators are designed to protect the wearer.

Fit Testing Methods

OSHA-approved fit testing of the N95 can be done using two different methods: Qualitative Fit Testing (QLFT) or Quantitative Fit Testing (QNFT). QLFT is a low cost, subjective pass/fail test that manually exposes the respirator wearer to a chemical stimulant that can only be detected if the respirator leaks unacceptably. QNFT is an objective test that involves the use of an instrument to measure how well the respirator fits by actual measurements taken during the fit test, and not being dependent upon a person's voluntary response.



FIT TESTING

HEALTH PROFESSIONALS CAN TRUST

Qualitative Fit Testing (QLFT)

There are four types of QLFT methods currently accepted by OSHA, but only two are usable for N95 respirators: Saccharin Solution Aerosol (sweet tasting) or Bitrex® Solution Aerosol (bitter tasting). The respirator wearer dons a fit test hood overhead as the fit test operator uses a hand-held nebulizer to spray the “challenge aerosol” into the hood through a specially designed port. The test operator must squeeze the nebulizer ball to induce the spray between 75 and 225 times for each fit test performed. All too often, QLFT methods are compromised by well-meaning test operators who skip some of the important steps and thereby unknowingly invalidate the whole fit test. This temptation exists when the same test operator rushes to fit test many people in a limited amount of time, day after day, or when the nebulizer clogs (common with use of Saccharin). There is also the potential for deceitful responses from the person being fit tested in an attempt to hurry the test process.



Qualitative fit test in progress.

Quantitative Fit Testing (QNFT)

There are two OSHA-accepted QNFT methods: Generated Aerosol (complex and lack portability) or Ambient Aerosol (simple and portable). Both methods measure an aerosol challenge agent on the outside of the respirator (C_{out}) as well as on the inside of the respirator (C_{in}) as the wearer performs a series of exercises that approximate conditions of use, while the results are recorded. The ratio of the two measurements (C_{out}/C_{in}) is called a fit factor. OSHA requires N95 respirators to have a fit factor of at least 100 to pass the fit test. This means that the air inside of a properly donned respirator must be at least 100 times cleaner than the air outside of the respirator.

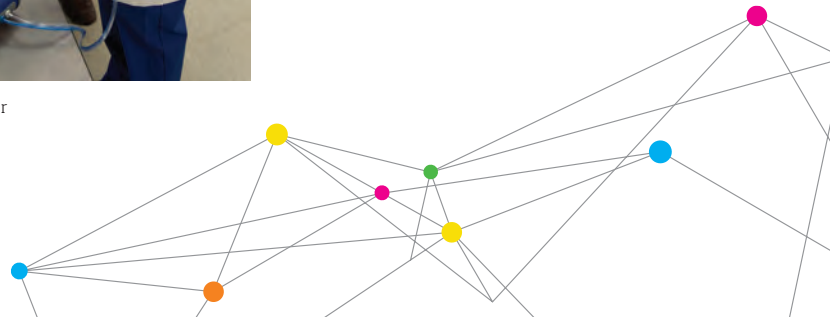
QNFT methods have a technological advantage in that they use computers and specially designed software to conduct and adhere to the fit test protocol, maintain records and facilitate printing of fit test certification cards that individual workers



Quantitative respirator fit test in progress.

can carry. It's virtually impossible to make mistakes and eliminates negative tendencies that plague QLFT.

Being more simple and portable, the Ambient Aerosol method of QNFT is the most economical and the industry preferred method. The challenge agent used is the ambient microscopic particles that are present at all times in the air we breathe. These particles can't penetrate the respirator filter, so any particles measured inside the respirator are attributed to a face seal leak.



PortaCount Respirator Fit Tester

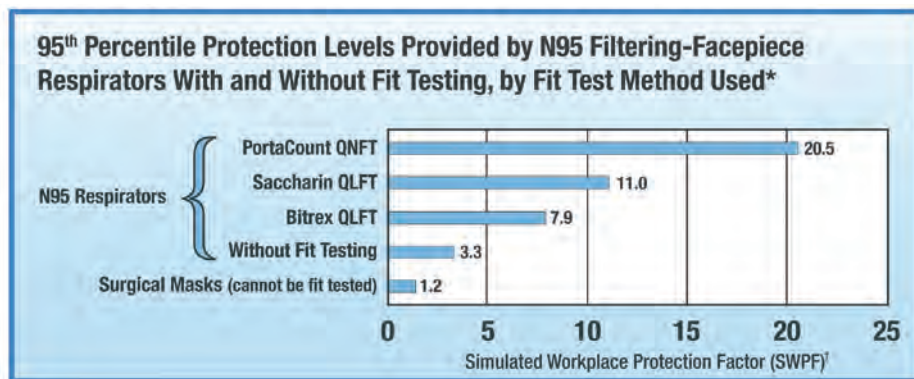
Ambient aerosol fit test instruments were first introduced by TSI more than 20 years ago. Today, TSI offers the industry-proven PortaCount® Respirator Fit Tester, the best OSHA-accepted fit test method. Only the PortaCount Fit Tester can:

- + Enable real-time fit optimization
- + Facilitate training on proper donning procedures
- + Speed up testing time using real-time fit factor technology
- + Eliminate errors with automated step-by-step guidance
- + Ease of managing reports and record keeping
- + Go above and beyond regulatory compliance
- + Test all types of respirators, including N95

Conclusion

Without a fit test, there is absolutely no way to know that a worker's respirator is providing the expected/maximum protection. Studies show that respirator wearers who undergo respirator fit testing achieve far greater protection than those who have not. This was confirmed by a study performed by the National Institute of Occupational Safety and Health (NIOSH) in 2007. The study compared the protection offered to wearers by N95 respirators with and without fit testing being performed, according to each of the fit test methods used. The graph included shows that any fit test method significantly improves respirator protection and QNFT is particularly beneficial. The study also included testing of some surgical masks which were found to provide almost no protection to the wearer, as highlighted earlier herein.

All too often companies, and healthcare facilities alike, look at fit testing as just another annual requirement that must be 'checked off' an already long regulatory 'to do' list. Yet study after study has shown that taking the time to do respirator fit testing properly ensures the respirator users are getting the expected protection from the respirator because they know how to use it and they know it fits. A formal Respiratory Protection Program along with a verifiable fit testing method is the only way to achieve this optimum protection.



*Duling, M.G., Lawrence, L.B., Slaven, J.E., Coffey, C.C., [HHS/PHS/CDC/NIOSH], "Simulated Workplace Protection Factors for Half-Facepiece Respiratory Protective Devices." *Journal of Occupational and Environmental Hygiene*, Vol. 4, No. 6, pp. 420-431, June, 2007.

†SWPF is the protection provided by a respirator, measured during a laboratory simulation of a workplace environment. A SWPF of 10 means that the air inside the respirator was 10 times cleaner than the air outside.