



When fit testing is needed

Respirators that have tight-fitting face-pieces are not one-size-fits-all. These face-pieces must form a proper seal around the wearer's face in order to prevent contaminated air from leaking into the face-piece. Therefore, fit testing is required before initial use and at least annually for all employees who are required to wear respirators with a tight-fitting face-piece. This applies to both air-purifying and atmosphere-supplying respirators regardless of whether they are operating in a positive or negative-pressure mode.

When the use of respirators with tight-fitting face-pieces is voluntary, no fit testing is required. In addition, some types of respirators, such as hoods and helmets, are designed to have loose-fitting face-pieces. Because these types of respirators do not rely on a tight face-piece-to-face seal to protect the worker, no fit testing is required.

Quantitative fit testing vs. qualitative fit testing

There are two general methods of fit testing: quantitative fit testing (QNFT) and qualitative fit testing (QLFT). QNFT is more accurate than QLFT, but the equipment needed to conduct QNFT is more costly. The National Fire Protection Association (NFPA) only permits QNFT. Cal/OSHA allows either QNFT or QLFT. In the case of negative-pressure air-purifying respirators, however, two conditions must be met before QLFT is permitted: the level of the air contaminant must be less than 10 times the permissible exposure limit (PEL) and less than the level that is immediately dangerous to life or health (IDLH).

Quantitative Fit Testing

QNFT provides a numeric measure of face-piece leakage. There are two types of systems that are commonly used today: ambient aerosol systems and controlled negative-pressure (CNP) systems. Ambient aerosol systems compute a respirator fit factor by measuring microscopic ambient air particles inside and outside the face-piece. The only commercially available ambient aerosol system available today is the PORTACOUNT® made by TSI. The PORTACOUNT® can be used with both elastomeric and filtering face-piece respirators. CNP systems pull a vacuum on the face-piece and measure the leakage rate. The only CNP system commercially available is the Fit-Tester made by Occupational Health Dynamics. The Fit-Tester can only be used with elastomeric face-pieces.

Qualitative Fit Testing

QLFT relies on the subjective sensation (taste, smell, or irritation) of the respirator wearer to a particular test agent to determine if a respirator fits. The pass or fail result is nonnumeric. The test agents allowed by Cal/OSHA include Bitrex™, banana oil (isoamyl acetate), saccharin solution, and irritant smoke (stannic chloride). The National Institute for Occupational Safety and Health (NIOSH) recommends against the use of both saccharin and irritant smoke: saccharin is considered a potential occupational carcinogen, and the hydrogen chloride produced by the irritant smoke can cause adverse health effects (coughing and irritation).

Fit Testing Protocols

No matter what type of fit-testing method is used, there are Cal/OSHA prescribed fit-testing procedures that must be followed. These protocols can be found in Appendix A of the Cal/OSHA respiratory protection regulation. So whether the fit testing is conducted in house or by an outside service provider, you need to make sure that the proper protocol is followed.

Getting Started

Unless you have experienced personnel in house that can conduct the fit testing, initially, you will probably want to contact an outside service provider to conduct the fit testing or to provide fit-testing training. Contact your occupational health clinic, your loss control representative, or the respirator manufacturer or supplier for assistance in finding a service provider. If you are considering conducting the fit testing yourself, QLFT kits are relatively inexpensive and can be purchased from many safety supply companies. Although QNFT systems cost thousands of dollars to purchase, they can be rented for much less.

Recordkeeping

Records of fit testing for each respirator wearer must be kept until the next fit test is administered. Each record must include:

- Name or identification of the employee
- Type of fit test performed
- Specific make, model, style, and size of the respirator
- Date of the test
- Results of the test

QNFT results have a numerical fit factor. If the QNFT system has a printout of the test results, keep those also. QLFT results are pass or fail.

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