

## Respiratory Fit Testing: Still Required, Still Necessary

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Decades have passed since the Occupational Safety and Health Administration (OSHA) began requiring employers to provide respirators for employees who must work within contaminated environments. Use of tight-fitting respirators in the workplace necessitates annual employee fit testing to help ensure that a proper face seal protects users from respirable contaminants. OSHA categorizes workplace respiratory hazards as those with insufficient oxygen or atmospheres containing chemical, biological or radiological contaminants in sufficient quantity to harm the health of employees and may exist as dust, fiber, fumes, gases, vapors, mists, or biological hazards.<sup>†</sup> Workplace contaminants are assigned specific Permissible Exposure Limits (PEL), the maximum concentration to which workers may be exposed over certain periods of time, per OSHA.

OSHA 1910.134(c)(1) states that:

In any workplace where respirators are necessary to protect the health of the employee or whenever respirators are required by the employer, the employer shall establish and implement a written respiratory protection program with worksite-specific procedures. Respirator use is required to protect employees from breathing contaminated and/or oxygen-deficient air when effective engineering controls are not feasible, or while they are being instituted.<sup>††</sup>

Fit testing evaluates respirator fit through use of qualitative or quantitative methods.<sup>†††</sup> Qualitative fit tests (QLFT) conducted within a controlled environment are subjective, as the worker's reaction and judgment as well as the tester's observations determine the pass/fail, non-numeric outcome. Qualitative fit testing is usually performed prior to use of half-mask respirators. Correct respirator fit using the qualitative method is achieved if the employee tested does not detect the test solution's taste or odor while wearing the respirator. Irritant smoke (possible irritant to eyes, lungs and nasal passages), banana oil, saccharin, and Bitrex solutions are acceptable per OSHA; bitter solutions are often preferred by testers, as an employee's reaction to bitter tastes and odors may be noticeable much earlier in the test's duration. The tester may more easily notice breakthrough, an indication that the employee's face seal is inadequate for respiratory protection, and that the worker should be tested using a different respirator.

Quantitative testing (QNFT) is objective; data gathered through instruments designed for this purpose determines proper facepiece fit. These instruments, using probed facepieces worn by the user, and particular ambient aerosols, draw air samples from inside the facepiece to assess leakage, that is, any break in the facepiece seal. One such instrument type is known as a condensation nuclei counter; another instrument type employs controlled negative pressure (CNP). These instruments produce measurable, quantifiable readings. Those who administer quantitative tests must be trained in operation and calibration of testing instrumentation, as well as the ability to calculate readings properly.

Both methods have strengths and drawbacks. Qualitative testing may be advantageous for small groups, as the protocol can be easily learned and test products may be a more economical choice. Quantitative test equipment is significantly more expensive and requires a test chamber, but produces faster, measurable results. Often when large groups must be fit tested, a fit test consultant may visit a facility or job site, providing employers with the convenience and efficiency of trained personnel without test equipment expenditures.

Quantitative testing determines fit factor for a given facepiece, the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.† OSHA 1910.134(f) (7) states that tight-fitting half-mask facepieces should achieve a fit factor that is equal to or greater than 100. Tight-fitting full facepieces should achieve a fit factor that is equal to or greater than 500. This difference in fit factor limits the use of qualitative fit testing for workplace applications where the known concentration of the contaminant is not present at levels exceeding 10 times the permissible exposure limit (PEL).† Quantitative fit testing methods should be used instead for such applications.

Some other considerations: employers must also ensure prior to fit testing that an employee is medically able to wear a respirator at work. Fit testing is not the same as a user seal check, an action taken by users every time a respirator is donned. Any accessories worn during respirator use, such as eye and hearing protection, should be worn during fit testing as a check for face seal interference; facial hair may also inhibit a good face seal. Employers should also offer employee training in respirator use, maintenance, and cleaning. In addition to annual fit testing, a worker who experiences significant weight loss or gain, undergoes major dental procedures or sustains a facial scar in the face seal area should also have another fit test performed.†††

Here we've touched upon some basic concepts for understanding the purpose and requirements of respiratory fit testing. OSHA provides many resources for comprehending and implementing fit test protocols for your workplace; start with OSHA Code of Federal Regulations (CFR) 1910.134 for Respiratory Protection†† as well as OSHA Assigned Protection Factors for the Revised Respiratory Protection Standard. †

Additional Resource: [Key Elements of a Sound Respiratory Protection Program](#)

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† [osha.gov/Publications/3352-APF-respirators.html](http://osha.gov/Publications/3352-APF-respirators.html)

†† [osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=standards&p\\_id=12716](http://osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=12716)

††† [osha.gov/video/respiratory\\_protection/fittesting\\_transcript.html](http://osha.gov/video/respiratory_protection/fittesting_transcript.html)

**Note:** This bulletin contains only a general description of the products shown. While uses and performance capabilities are described, under no circumstances shall the products be used by untrained or unqualified individuals and not until the product instructions including any warnings or cautions provided have been thoroughly read and understood. Only if they contain the complete and detailed information concerning proper use and care of these products.



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