Using the PORTACOUNT® Respirator Fit Tester to Fit Test Positive Pressure Respirators

Application Note ITI-024

On January 8, 1998 OSHA released the long-awaited revision to the Respiratory Protection Standard 29CFR1910.134. It replaces the standard with the same name and number that was released in 1971. This new revision has far reaching impact on a large number of existing OSHA standards in that it replaces certain provisions related to respirator use.

One of the new requirements is that OSHA now requires all tight-fitting respirator facepieces to be fit tested annually. This includes air-supplied and positive-pressure respirators such as Powered Air Purifying Respirators (PAPR), airline respirators, and Self Contained Breathing Apparatus (SCBA). With few exceptions, these respirator styles were previously exempted from OSHA's fit testing requirements.

Self Contained Breathing Apparatus (SCBA) are respirators that supply breathing air from a backpack mounted tank. The most common application for SCBA is fire fighting. There are other types of positive-pressure respirators also, including air-line and recirculating respirators.

Powered Air Purifying Respirators (PAPRs) are a special class of respirator that utilizes a battery operated blower motor to pump air into the mask through an air-purifying cartridge. The blower/filter assembly is usually either belt mounted or fastened to the front of the facepiece.

The OSHA fit testing requirement is only for tight-fitting masks. Tight fitting respirators utilize a facepiece similar to the facepiece on a conventional negative-pressure air-purifying respirator with filter cartridges. In fact, many respirator manufacturers use the identical facepiece for negative and positive-pressure respirators. Tight-fitting masks form a tight seal around the wearer's face.

Loose fitting respirators usually employ a hood that fits over a person's head and loosely seals around the neck. The quality of the seal is not dependent on a close physical match with the wearer's body. Since there is no "seal" to test, there is no requirement to do a fit test.

Respirator fit testing (testing facepiece leakage) cannot be done while the pressure inside the facepiece is maintained positive by some outside air supply. The positive-pressure will alter the seal and the measurement will not reflect how well the shape of the facepiece matches the person's face. For this reason, all fit testing of positive-pressure respirators must be done in negative-pressure mode, or in other words, without a forced air supply. Any tests done in positive pressure mode are overall performance tests, not fit tests. Hood-style respirators can be performance tested but not fit tested because there is no face seal to test.

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There are two ways to accomplish fit testing positive-pressure masks in negative-pressure mode. The method preferred by many is to temporarily convert the employee's assigned mask into a negative-pressure mask. This is accomplished through the use of special fit test adapters that temporarily attach to the mask and allow the use of filter cartridges. Added benefits of this method are that an integrity test of the mask is performed simultaneously with the fit test and also, the hygienic concerns associated with sharing a test mask are greatly reduced. **Fit test adapters** are available from the respective respirator manufacturer and from TSI for many popular respirators.

When an adapter is not available, the only alternative is to use a surrogate mask or test mask. This involves purchasing a negative-pressure air-purifying mask that has the same sealing surfaces as the positive-pressure mask that will actually be used for respiratory protection. For quantitative fit testing, the mask will need a sampling port so that a sample can be drawn from the breathing zone. Most respirator manufacturers have these available. If the mask comes in multiple sizes, you will need at least one test mask in each size. Using this technique, fit testing for positive-pressure respirators becomes identical to fit testing for negative-pressure respirators.

For those people who wish to conduct performance tests on positive-pressure respirators using a PORTACOUNT® fit tester, there are a few special precautions. The primary concern is aerosol particulates in the air supply. The PORTACOUNT fit tester will measure these particles as leakage and report performance factors (fit factors) that are significantly lower than actual. Most PAPRs have a blower motor on the clean side of the filter. Most of these motors generate small particles that the PORTACOUNT can easily measure. Likewise, air from SCBA tanks, and from compressors, contain significant numbers of particles. Grade D breathing air is by no means particle free. The only way to overcome this problem is to pass the air through a HEPA filter just before it reaches the facepiece. There is no OSHA requirement to do this type of performance testing.

**Related information:**
- [Application Note ITI-029](#), What You Need to Quantitatively Fit Test Various Brands of Self-Contained Breathing Apparatus Available in the USA
- [Fit Test Adapter List](#)