Introduction
The guidance provided below is a detailed description of the process used to quantitatively fit test filtering-facepiece (disposable) respirators, including the popular N95 variety used in health care facilities for protection against tuberculosis. The procedure uses the TSI PORTAcount Plus with the N95-Companion accessory.

Don't let the length of this document concern you. The actual test for compliance with OSHA's tuberculosis policy (8 exercises) only takes about 10 minutes to perform. Due to the needed setup steps, repetition of failed tests and inevitable slack time between tests, you can expect to fit test about four people an hour on average.

Note: Fit tests on respirators equipped with series-100 or series-99 filters may be fit tested with the PORTAcount Plus alone (no N95-Companion).

Training first!
To achieve rated performance, respirators have to be donned and worn properly. The best way to make sure employees get as much protection as possible is to provide thorough training.

Good training is particularly critical for most brands of filtering-facepiece respirators. In addition to positioning the straps, the user must learn how to precisely shape a ductile nose band. That's not as easy as it sounds. If the nose band isn't shaped just right, the protection level afforded by the mask will be compromised. Adverse health effects notwithstanding, insufficient training up front often results in wasted time later during fit testing. A high percentage of employees may fail the fit test over and over just because they don't know how to adjust the nose band.

There is no ideal respirator training program that suits all organizations. Some organizations require a formal training class and others get good results with a one-on-one approach. Use a training technique that's comfortable for your organization, and make sure proper donning technique is thoroughly covered. Different respirator manufacturers specify different donning methods. Contact your respirator manufacturer for recommendations specific to the respirators your organization uses.
Select a suitable location for doing the fit test
The Model 8026 Particle Generator should normally be used along with the N95-Companion to supplement the naturally occurring ambient particles. In order for the generator to work properly, fit testing must be done in a room that is not overly large. A typical office, conference room or other area not larger than about 300 square feet should work fine. If the room is too large you may have difficulty obtaining the minimum 70 particles per cubic centimeter needed by the N95-Companion. The Model 8026 Particle Generator is included with every N95-Companion.

Get equipment ready
Start the Model 8026 Particle Generator to boost the ambient particle count. Let it run for 15 minutes or so before proceeding so that the ambient particle level has a chance to stabilize. Have the PORTACOUNT Plus and attached N95-Companion warmed up and ready to go. If you just turned the instrument on, make sure the system is functioning properly by performing the factory recommended daily checks, including the particle check, zero check and max fit factor check. FitPlus™ for Windows software prompts you through this simple procedure and automatically records the results in the Daily Checks database.

Determine who will be next for a fit test
Check to make sure this person is ready to be fit tested. Has training been completed? If a smoker, has he or she refrained from smoking for at least one hour?

Select a mask to fit test
Care in choosing a mask size that's likely to fit the individual saves time by reducing the need for repeat testing. Filtering-facepiece respirators are inherently difficult to perform a user seal check on. You will have to rely on the user's assessment of comfort as well as your own judgment. Your respirator manufacturer can provide guidance, but there's no substitute for on the job experience.

Install sampling probe onto mask

*Note: This method works on any disposable respirator.*

Take a sampling probe and a push nut from the N95-Companion case and install it onto the respirator that will be used for the fit test. Use the probe installation tools provided. Locate the probe so that it pierces the mask as near as possible to the "breathing zone" located between the user's nose and mouth. [Detailed instructions.]
Have employee don the N95-Companion's sampling pendant using the attached neck strap

In addition to housing a valve that switches the sample flow from one hose to the other, the sampling pendant provides support for the hoses to minimize interference with the respirator.

Attach the sample tube from the sampling pendant to the to mask before donning. The sample tube is clear-colored and marked with the word "SAMPLE".

It's very awkward to connect the hose after the mask is donned. Inexperienced fit testers make this mistake often, requiring the employee to remove the mask and then don it again.

Have employee don mask WITHOUT ASSISTANCE

It is extremely important that the employee don the respirator without physical or verbal assistance of any kind. Verifying that the person knows how to put the mask on properly is the primary reason for fit testing in the first place. Getting the right size mask is also important, but it's secondary. When a person passes a properly conducted fit test they prove that they know how to don the mask correctly AND have the right size mask. If you provide donning assistance, you may determine if the mask is the right size but you won't know if the employee's training has been effective. You won't be there every day to help this person don a respirator. They must know how to do it themselves.

One of the primary advantages of quantitative fit testing is the documentation provided by the fit test software. You get proof that the employee knew how to don the mask properly and was issued the right size. You can't get this with a qualitative fit test.

Start FitPlus software v3 fit test process

On the computer screen:

- Step 1: Select the employee from the People Database. Create a new record if necessary. Click NEXT.
- Step 2: Select the respirator to be used from the Respirator Database. Click NEXT.
- Step 3: Make sure the exercise protocol is the proper one. The software remembers which protocol was used last. Type in the mask size and make sure the pass/fail level is correct. A minimum fit factor of 100 is required for filtering facepieces in the U.S. Click NEXT.
- Step 4: Click START to begin the fit test.
Have employee do the required exercises

Once the fit test starts, exercises proceed one after the other without pause. The software will tell the employee which exercises to do and when to start each one.

During the fit test a fit factor will be measured for each exercise. At the end of the test an overall fit factor will be calculated using each of the exercise fit factors. This overall fit factor is the final result of the fit test and is the only number that counts. It is possible to fail an individual exercise and still achieve a passing overall fit factor.

About exercises:

- **DO NOT** allow the mask to be adjusted during the exercises. Doing so negates the results from previous exercises. The idea is to thoroughly test a single donning.
- OSHA requires that the person being tested stand rather than sit during the exercises.
- Each exercise requires about 90 seconds when using the N95-Companion. If you are doing a typical 8-exercise fit test it will take about 10 minutes to complete.

Exercise sequence and protocol


**Note:** OSHA requires the person being fit tested to do the exercises from a standing position.

- **Normal breathing** Just like it says. Stand there and breathe normally.
- **Deep breathing** Take deep breaths at a leisurely pace.
- **Head side to side** Hold the shoulders steady and turn the head slowly from full left to full right, pausing momentarily at each extreme. Two seconds per swing is a good pace.
- **Head up and down** Slowly alternate between tilting the head back to look up at the ceiling and then forward to look at the floor. Two seconds per swing is a good pace.
- **Talking out loud** Speak out loud for the entire exercise. Use a voice level similar to what will be expected during respirator use. The "Rainbow Passage" is a popular paragraph to read out loud. If the end of the passage is reached before the exercise is over, repeat from the beginning. Alternately, counting out loud is acceptable.
- **Grimace** Make an exaggerated smile or frown in an effort to intentionally break the face seal.
- **Bending over** Bend at the waist as if touching toes. Repeat at a leisurely pace.
- **Normal breathing** Same as before.
Test complete

Review the overall fit factor displayed on the computer screen.

If the fit test passed, (overall fit factor greater than 100) issue that exact size and model respirator to that person.

Now may be a good time to print a fit test report for that individual. You can skip the printout for now if you want because the data is stored on the computer hard disk and can be easily retrieved at any time. Some organizations keep a hard copy printout for archival purposes. Others rely on the data stored on the computer’s hard disk. If you don't make a printout, make sure you backup your hard disk regularly. This data is expensive to re-create!

If the test failed, you must determine the appropriate action to take. This is where the fit test operator's experience comes into play. There is no “cook book" procedure for determining what to do next. The big questions are: Should a different size mask be tried or does the employee need additional guidance on how to don the respirator correctly? Is there something unusual about this person’s facial features that makes respirator fit difficult? Or did the person smoke a cigarette recently and neglect to tell you about it earlier? In any case, the fit test must be repeated in its entirety.

Tip: If you are having difficulty getting good fits, and you suspect that the N95-Companion is having problems, try a short fit test while using both hands to hold the respirator against your face around the edges. If you get a high fit factor, it shows that the problem is face seal leakage. The real time fit factor display in FitPlus software is ideal for this purpose.