

# *How do I perform a respirator fit test?*

*A procedure for qualitatively fit testing respirators used to protect employees from exposure to Mycobacterium tuberculosis (M. tb).*

N-95 respirators are the minimum level respirator to be used for protection against *M. tb*. Higher level respirators such as high efficiency particulate air filters (HEPAs) may also be used. The following procedure can be used with N-95 or higher level respirators.

## **There are 4 steps in the fit testing process:**

1. Choosing the respirator
2. Fit checking
3. Taste threshold (sensitivity) screening
4. Fit test

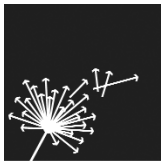
## *Choosing a respirator*

Each employee should have the opportunity to select a respirator that is comfortable on his/her face. This means that there must be a selection of respirators to choose from. At a minimum, several sizes of one type of respirator must be available, but it is preferable to have two or three different brands of respirators in multiple sizes available. The employee should be taught to put the respirator on and place the straps correctly, before deciding if the respirator is comfortable. This includes positioning the facepiece on the chin and the bridge of the nose. Employees who wear glasses should put them on to determine if the respirator interferes with the placement of the glasses.

Once the employee has selected a comfortable respirator, s/he should be taught to perform both positive and negative fit checks.

## *Fit checking*

This assures the employee that the respirator is sealing against the face. It should be done each time the respirator is worn. There are two types of fit check: positive pressure and negative pressure. Positive pressure refers to the user breathing out, exerting a positive



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pressure on the respirator. Negative pressure refers to the user breathing in, exerting a negative pressure on the respirator.

To perform the fit check, the employee should put on the respirator correctly. The entire surface of the respirator must be covered completely. This is because the entire surface acts as the filter. Although some people can cover the surface with their hands, the easiest way is to use a piece of plastic, such as household plastic film, to completely cover the respirator. This way, it is not difficult to do.

### **Positive pressure fit check**

Once the surface of the respirator is covered, the wearer should breathe out gently and feel if air is escaping around the face, rather than through the respirator. If air is felt escaping around the facepiece, the respirator should be repositioned and re-fit checked. If the wearer does not feel air escaping around the facepiece, s/he has passed the positive fit check.

### **Negative pressure fit check**

To perform the negative fit check, the respirator should again be covered. The wearer should gently inhale. This should create a vacuum, causing the respirator to be drawn in slightly toward the face. If the respirator is not drawn in toward the face, it should be removed and examined for any defect such as a small hole or distorted sealing edge. If none is found, the respirator should be repositioned and a second attempt at negative pressure fit testing should be made. If the respirator draws in toward the face while the wearer covers the surface and inhales, s/he has passed the negative pressure fit check.

Both the positive pressure and the negative pressure fit check must be passed before the respirator can be used or fit tested.

## *Taste threshold screening*

This can be done once the wearer has passed both positive and negative fit checks. Fit testing kits can be purchased from various sources and contain all the supplies needed to perform taste threshold screening and fit testing.

A dilute solution of the testing substance is used to determine that the wearer can detect the substance that will be used for fit testing. There are two substances that can be used to fit test N-95 respirators:

- Saccharine, sweet taste
- Bitrex™, bitter taste

**Note: Irritant smoke or “banana oil” fit testing cannot be used for fit testing N-95 respirators because the filter material in these respirators is not impervious to either irritant smoke or oil. These methods may be used with other respirator types, but are not described in this FAQ.**

Both saccharine and Bitrex™ require a nebulizer, which is included in the fit-testing kit. Fit testing kits also include two bottles of solution, and a hood and collar. One bottle of solution is the sensitivity test solution; the other is the fit test solution.

### *To conduct the taste threshold screening*

Make sure that the test subject has not eaten, chewed gum, or had anything except water to drink for at least 15 minutes.

1. If the subject has a respirator on, it should be removed.
2. Assemble and place the collar and hood over the test subject's head.
3. Position the hood so that it sits forward on the subject's shoulders, allowing about six inches of space between the face and the hood window.
4. Tell the subject to breathe with his/her mouth open and tongue extended.
5. Place the nebulizer with the sensitivity solution through the hole in the window of the hood and fully squeeze the bulb 10 times.
6. After the 10 squeezes, ask the test subject if s/he can detect a sweet taste (if using saccharine) or a bitter taste (if using Bitrex).  
If the subject can taste the substance, note that it was tasted after 10 squeezes, and proceed to the fit test.
7. If the subject did not taste the solution, repeat an additional 10 full squeezes into the hood.  
If the subject can taste the substance, note that it was tasted after 20 squeezes, and proceed to the fit test.
8. If the subject did not taste the solution, repeat an additional 10 full squeezes into the hood.  
If the subject can taste the substance, note that it was tasted after 30 squeezes, and proceed to the fit test.
9. If, after 30 squeezes, the subject cannot taste the sensitivity solution, you must use a different substance.  
For example, if the subject did not taste the saccharine, you must re-do the taste threshold testing using Bitrex.
10. Remove the hood and collar, and give the subject a brief period of time to clear the taste.

### *The fit test*

Fit testing can be performed after a successful taste threshold screening. Make sure the test subject has not eaten, chewed gum, or had anything except water to drink for at least 15 minutes.

1. Have the test subject put on the respirator and perform both positive and negative fit checks.
2. The subject should wear the respirator for at least five minutes before the fit test.
3. Place the collar and hood over the test subject's head.
4. Position the hood so that it sits forward on the subject's shoulders, allowing about six inches of space between the face and the hood window.

5. Tell the subject to breathe with his/her mouth open and tongue extended, with the respirator on, as in the sensitivity testing.
6. Place the nebulizer with the fit testing solution into the hole in the window of the hood and fully squeeze the bulb the same number of times needed in the taste threshold screening, either 10, 20, or 30 times.
7. Continue to inject ½ of the original number of squeezes (5, 10, or 15) every thirty seconds.
8. The test subject should perform the following exercises for at least 30 seconds each, while the tester continues to squeeze the correct amount every thirty seconds:
  - Normal breathing
  - Deep breathing
  - Turning head from side to side, inhaling at both sides
  - Nodding head up and down, inhaling in both up and down positions
  - Bending forward to touch toes, inhaling when head is down
  - Talking (Ask the subject to read a paragraph aloud, such as *The Rainbow Passage*, or ask them to tell you a story, etc.)
  - End by resuming normal breathing
9. The fit test should be ended anytime the subject reports tasting the fit test aerosol.
10. The fit test is successful if the subject does not taste the fit test aerosol during the entire test.

Included on the next page is a copy of *The Rainbow Passage* in both English and Spanish.

This information is available at our website: [www.currytbcenter.ucsf.edu](http://www.currytbcenter.ucsf.edu)

# *The Rainbow Passage*

## *Leyenda del Arco Iris*

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

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Cuando los rayos del sol chocan contra las gotas de lluvia suspendidas en el aire, éstas actúan como un prisma y forman un arco iris. El arco iris es la división de luz blanca en muchos bellos colores. Éstos toman la forma de un largo arco, con una trayectoria que es muy alta, y sus dos extremos aparentemente más allá del horizonte. Existe, de acuerdo a la leyenda, una vasija llena de oro en uno de sus extremos. La gente la busca, pero nadie la encuentra. Cuando el hombre busca algo que está más allá de su alcance, sus amigos dicen que está buscando la vasija llena de oro que está al final del arco iris.