

## NCS Form 013

### Qualitative Fit Test Protocol

#### **General Fit Test Precautions**

1. Before performing a fit test, make sure the employee can detect the test agent. Some employees may not be sensitive to the test agent. Temporary conditions such as a head cold can also limit an employee's sensitivity to the test agent.
2. Beware of olfactory fatigue. Over time, an employee's olfactory nerve may tire and be unable to sense the presence of the test agent. This is particularly true in cases where an employee has to be fitted with several face piece sizes before the right one can be selected.
3. Use the right cartridge for the test agent (e.g., organic vapor cartridges for isoamyl acetate, HEPA cartridges for irritant smoke).
4. The fit tester shall protect himself/herself by wearing a respirator when performing a test using irritant smoke.
5. Make sure the employee being tested has been medically certified and trained to use the respirator before performing the fit test.
6. Recognize and evaluate characteristics of the test subject which may affect the respirator seal, such as improper donning or fit check procedures, facial hair or irregularities such as scars or dentures, safety glasses, or other equipment worn on the head or face.
7. Recognize behavioral characteristics likely to affect the fit test, such as lack of cooperation, too much cooperation, or evidence of claustrophobia.
8. Ask the subject to clean and inspect respirator prior to putting it on and checking its fit.
9. Refrain from coaching or aiding the test subject. Conduct refresher training as necessary.
10. Refrain from repeatedly fit testing the same respirator until an adequate fit is achieved.

#### **Isoamyl Acetate (or Banana Oil) Protocol**

##### 1. Preparation of Test Solution

- a. The following supplies are needed:
  - Three one-liter jars with metal lids and some odorless water.
  - Two eye droppers with 0.5 and 1.0 ml markings.
- b. Label each jar lid, "1", "2", and "3"
- c. Two jars will be used for screening workers while the third will be for the stock solution.
  - Put 1.0 ml of isoamyl acetate and 800 ml of water Jar "1".
  - Put 0.4 ml of Jar "1" solution and 500 ml of water in Jar "2".
  - Put 500 ml of "pure" water in Jar "3".
- d. Shake each jar for 30 seconds during preparation.
- e. Jar 1 and 3 must be prepared at least weekly.
- f. Jar 2 must be prepared daily.
- g. Be sure to prepare the jars in a separate room from the testing area.

##### 2. Screening Test

- a. The screening test shall be done in a separate room from the one used for the fit test.
- b. Give the following instructions: "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time (and then replace the lid before the second jar is opened), and sniff at the mouth of the bottle. Indicate which bottle contains banana oil. Do not be afraid to state that you can detect the odor of bananas from either jar."
- c. If the test subject cannot identify the jar with isoamyl acetate in it, do not perform the fit test.

##### 3. Fit Test

- a. Erect a fit test chamber
  - Use a clear 55-gallon drum liner (or a clear asbestos waste bag) suspended over a two foot diameter frame so that the top of the chamber is 6" above the subject's head.
  - The inside top center of the chamber should have a hook attached.
- b. Use organic vapor cartridges that are replaced at least weekly.
- c. Have the test subject place a 6" x 5" piece of paper towel or other porous, absorbent single-ply material, folded in half and wetted with 0.75 ml of pure isoamyl acetate on the hook at the top of the chamber.

- d. Allow two minutes for the isoamyl acetate concentration to stabilize; during this time advise the subject to notify you immediately if he detects the odor of bananas during any of the exercises.
- e. Begin the exercises.
  - At a minimum, the following exercises shall be conducted during each fit test in the listed order:
    - 1) Normal breathing
    - 2) Deep breathing
    - 3) Turning head from side to side
    - 4) Moving head up and down
    - 5) Talking/counting out loud
    - 6) Bending up and down
    - 7) Grimacing/making funny faces
    - 8) Normal breathing
  - Each exercise should last at least one minute with the exception of the seventh exercise.
- f. Stop the test if the employee detects a banana like odor during any exercise. If the employee fails one exercise, the test is considered a failure.
- g. If the test has failed, repeat the odor sensitivity test. If the employee fails to detect the test agent, wait five minutes and try again.
- h. Repeat the test procedure with another respirator (or with the original one adjusted/straps tightened).
- i. Upon successful completion of these exercises, have the employee remove his mask in the chamber.
  - If he cannot smell a banana odor, the test is invalid.
- j. Have the employee remove the towel as he leaves the chamber.
- k. Place the used towel in a sealed container.
- l. Complete the Fit Test Form.
- m. Explain the results to the employee.
- n. Sign and date the form and then have this employee do the same.
- o. Retain the record as delineated above.

### **Irritant Smoke Protocol**

1. Preparation for the Test
  - a. Equip the test respirator and the fit tester's respirator with HEPA cartridges.
  - b. Set up a test chamber similar to that discussed for isoamyl acetate.
  - c. Place a small hole in the front of the bag across from the employee's respirator.
  - d. Remember that some smoke will leak from the chamber; the tester will also want to wear a respirator.
  - e. Break both ends of a ventilation smoke tube containing stannic oxychloride.
  - f. Attach an aspiration bulb to one end of the smoke tube.
2. Screening Test
  - a. Allow the employee to smell a weak concentration of the smoke before the respirator is donned so that he/she can become familiar with its odor.
  - b. Do not perform the test unless the employee can detect the irritant smoke.
3. Fit Test
  - a. Have the employee enter the test chamber and begin adding smoke to the chamber by pumping the aspirator bulb. Advise the employee to notify you immediately if he detects irritant smoke entering his respirator.
  - b. Have the employee perform the same exercises as listed for the isoamyl acetate fit test for at least one minute each.
  - c. Stop the test immediately if the employee detects the odor of the tube or starts to cough or choke during any exercise. If the employee fails one exercise, the test is considered a failure.
  - d. If necessary, repeat the test procedure with another respirator (or with the original one adjusted/straps tightened).
  - e. Upon successful completion of the exercises, have the subject remove one cartridge from the respirator.
    - Failure to evoke some response (coughing, choking, or aversion) voids the test.
  - f. Complete the Fit Test Form.
  - g. Explain the results to the employee.
  - h. Sign and date the form and then have the employee do the same.
  - i. Retain the records as delineated above.