

Fit-Testing Procedures

There are two methods of fit-testing that may be used to verify the seal and effectiveness of the respirator:

- Qualitative Fit Test (QLFT) using irritant smoke
- Quantitative Fit Test (QNFT) using the Controlled Negative Pressure Technique

Irritant Smoke Test Protocol (Stannic Chloride)

This qualitative fit test uses a person's response to the irritating chemicals released in the air to detect leakage into the respirator. Since this smoke is irritating to eyes, lungs and nasal passages, the respirator to be tested will be equipped with HEPA filters and the test will take place in a well ventilated area. The test operator will take all the necessary precautions to minimize the employee's exposure to the irritant smoke. The following steps illustrate the sequence of events for a Qualitative Fit-Test Procedure:

- a) *Sensitivity Screening Check:* The test subject must demonstrate his or her ability to detect a weak concentration of the irritant smoke. The person will be advised to keep their eyes closed for the duration of the test in order to minimize eye irritation.
- b) *Testing Protocol:* The following sequence of exercises will be performed while the test operator directs a stream of irritant smoke from the smoke tube toward the face seal area of the test subject using a low flow pump or a squeeze bulb. The test operator shall begin at least 12 inches from the face piece and move the smoke stream around the perimeter of the face of the test subject. The test operator shall gradually make two more passes around the perimeter of the mask moving to within six inches of the respirator. If the person being tested has not had an involuntary response and/or detected the irritant smoke, the tester will proceed with the following test exercises.
 - 1) Normal breathing: In a normal standing position, without talking, the test subject shall breathe normally.
 - 2) Deep breathing: In a normal standing position, the test subject shall breathe slowly and deeply using caution to prevent hyperventilation.
 - 3) Turning head side to side: Standing in place, the test subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.

- 4) Moving head up and down: Standing in place, the test subject shall slowly move his/her head up and down, and will be instructed by the test operator to inhale in the up position (i.e., when looking toward the ceiling).
- 5) Talking: The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test operator. The subject can read from a prepared text such as the Rainbow Passage; count backward from 100; or recite a memorized poem or song.

Rainbow Passage

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 round 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 reach, his friends say he is looking for the pot of gold at the end of the rainbow.

- 6) Grimace: The test subject shall grimace by smiling or frowning. (This applies to QNFT testing only)
- 7) Bending over: The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type respirators that do not permit bending over at the waist.
- 8) Normal breathing: Same as exercise (1)
 - a) Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test operator regarding the comfort of the respirator upon completion of the protocol. If the respirator does not provide an acceptable fit, another respirator model shall be tested. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

- b) *Test outcome*:

If the test subject detects the irritant smoke at any time, the test is failed and the entire sensitivity check and fit test procedure must be repeated. Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a *second sensitivity screening check* with the smoke from the same smoke tube used during the fit test once the respirator has been removed to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test. If a response is produced

during this second sensitivity check, then the fit test is passed. The test outcome is documented in writing on the Respirator Use Training Form – Appendix 3.

Controlled Negative Pressure Test Protocol

The CNP fit test method measures leak rates through the face piece as a method for determining the face piece fit for negative pressure respirators. For the purpose of this test, the inhalation valves will be removed and special adaptors will be installed. The following sequence of exercises will be performed:

Exercises ⁽¹⁾	Exercise procedure	Measurement procedure
Facing Forward	Stand and breathe normally, without talking, for 30 seconds.	Face forward, while holding breath for 10 seconds.
Bending Over	Bend at the waist, as if going to touch his or her toes, for 30 seconds.	Face parallel to the floor, while holding breath for 10 seconds
Head Shaking	For about three seconds, shake head back and forth vigorously several times while shouting.	Face forward, while holding breath for 10 seconds.
REDON 1	Remove the respirator mask, loosen all face piece straps, and then redon the respirator mask.	Face forward, while holding breath for 10 seconds.
REDON 2	Remove the respirator mask, loosen all face piece straps, and then redon the respirator mask again.	Face forward, while holding breath for 10 seconds.