

ALLEGRO INDUSTRIES

Qualitative Smoke Fit Test Kit Instructions

STANDARD SMOKE TEST P/N 2050

WARNING

Read these instructions in their entirety, including all warnings and cautions before performing the Respirator Fit Test. **DO NOT** generate smoke into a hood, tent or any other confinement placed over the head of the test subject. **SERIOUS INJURY CAN OCCUR.** Respirator fit testing must be performed in strict compliance with OSHA 29CFR 1910.134 Irritant Smoke Respirator Fit Test Protocol.

Use only in well ventilated areas. Avoid breathing the smoke directly. Wear respiratory protection if the smoke cannot be avoided. Extended exposure to high concentrations of the smoke may cause injury.

Qualitative Fit Testing:

- Before an employee may be required to use any respirator with a negative or positive pressure tight-fitting facepiece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used. Ensure employees using a tight-fitting facepiece respirator pass an appropriate qualitative fit test (QLFT)
- Ensure an employee using a tight-fitting facepiece respirator is fit tested prior to initial use of the respirator, whenever a different respirator facepiece (size, style, model or make) is used, and at least annually thereafter.
- Conduct an additional fit test whenever the employee reports, or the employer, supervisor, or program administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.
- QLFT may only be used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less. Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by performing a qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.
- QLFT of respirators shall be accomplished by temporarily converting the respirator user's actual facepiece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure air-purifying respirator facepiece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator facepiece.
- Any modifications to the respirator facepiece for fit testing shall be completely removed, and the facepiece restored to NIOSH-approved configuration, before that facepiece can be used in the workplace.

Fit Testing Procedures - General Requirements

- 1) The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user. The mask is donned and worn at least five minutes to assess comfort.
- 2) Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator.
- 3) The following criteria shall be used to help determine the adequacy of the respirator fit:
 - Chin properly placed
 - Adequate strap tension, not overly tightened
 - Fit across nose bridge
 - Respirator of proper size to span distance from nose to chin
 - Tendency of respirator to slip
 - Self-observation in mirror to evaluate fit and respirator position
- 4) The test subject shall conduct a negative and positive pressure seal checks, as recommended by the respirator manufacturer. Another facepiece shall be selected and retested if the test subject fails the user seal check tests.
- 5) The test shall NOT be conducted if there is any hair growth between the skin and the facepiece sealing surface, such as stubble beard growth, beard, mustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.
- 6) If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties.
- 7) If the test subject finds the fit of the respirator unacceptable, he/she shall be given the opportunity to select a different respirator and to be retested.
- 8) Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.
- 9) The fit test shall be performed while the test subject is wearing any applicable safety equipment, which could interfere with respirator fit, such as safety glasses.
- 10) Ensure that persons administering QLFT are able to calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is kept clean, well maintained and in proper working order.

Precautions:

- This qualitative fit test uses a person's response to the irritating chemicals released in the "smoke" produced by a Stannic Chloride ventilation smoke tube to detect leakage into the respirator.
- The respirator to be tested shall be equipped with High Efficiency Particulate Air (HEPA) or P100 series filter(s).
- No form of test enclosure or hood for the test subject shall be used.
- The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.
- The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.
- Not all respirators are designed to protect the wearer from irritant smoke. Consult the respirator's manufacturer to determine which models may be fit-tested using OSHA's irritant smoke protocol.

Preparing For Fit Testing:

- 1) The Respiratory Qualitative Smoke Fit Test Kit contains the following items:
 - Aspirator squeeze bulb. 1 EA
 - ¼" tubing 1 EA
 - Box of Stannic chloride tubes 6 per box
 - Smoke Tube Caps 6 EA
 - Storage pouch 1 EA
 - Instructions 1 EA
- 2) Remove contents from box and inspect.
- 3) Install the piece of ¼" tubing to the hose barb on the air bulb.
- 4) Take a smoke tube, using the tube breaker twist the tube full circle to score and break off the tube tip.
- 5) Take the smoke tube and insert the broken tube end into the plastic tubing.
- 6) Cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.

Sensitivity Screening:

- 1) The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.
- 2) The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.
- 3) The test subject shall be allowed to smell a weak concentration of the irritant smoke **before** the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke.
- 4) Using the aspirator squeeze bulb, the test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction.

Fit Test Procedure:

- 1) The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).
- 2) The test subject shall be instructed to keep his/her eyes closed.
- 3) The test operator shall direct the stream of irritant smoke from the smoke tube toward the face seal area of the test subject, using the aspirator squeeze bulb. Fully squeezing the aspirator squeeze bulb once every 20 seconds (approximately 200 milliliters per minute).
- 4) The test operator shall begin at least 12 inches from the facepiece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.
- 5) If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.

Test Exercises:

- 1) The test subject shall perform exercises, in the test environment, in the following manner. 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 conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.
 - a) **Normal breathing.** In a normal standing position, without talking, the subject shall breathe normally.
 - b) **Deep breathing.** In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.
 - c) **Turning head side to side.** Standing in place, the 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.
 - d) **Moving head up and down.** Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).
 - e) **Talking.** The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. 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.
 - f) **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 QNFT or QLFT units that do not permit bending over at the waist.
 - g) **Normal breathing.** Same as exercise (a)
- 2) The exercises shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.
- 3) If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.
- 4) 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.
- 5) If a response is produced during this second sensitivity check, then the fit test is passed.

After all fit testing has been completed:

- Remove the smoke tube, cap both ends and discard according to the MSDS.
- Store unused tubes in a cool, dry, secure place.

IMPORTANT NOTICE!

The Allegro Industries fit test instructions are in accordance with with *29CFR Part 1910.134, Appendix A*. Consult that document for supplemental fit test regulations and guidelines. Make certain you read and understand all precautions and requirements listed in these instructions.

The smoke fit test method generated controversy during OSHA rulemaking proceedings. OSHA is continuing to accept the irritant smoke QLFT protocol for use under this standard because it is relatively inexpensive. The irritant smoke fit test is the only QLFT method that does not rely on the subjective response of the employee being tested.

Nevertheless, OSHA is aware that high levels of irritant smoke can be produced during a fit test and that these concentrations can be dangerous. Employees exposed to excessive concentrations of irritant smoke have suffered severe reactions. Employers using the irritant smoke must ensure fit test operators are trained, and are in full compliance with *29CFR Part 1910.134, Appendix A*.

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