Qualitative Respirator Fit Testing
Opening Points

- This presentation is based on current United States federal OSHA requirements 29 CFR 1910 and 29 CFR 1926. US state or other country requirements may be different.

- These slides should not be relied upon in isolation, as the content is often accompanied by additional and/or clarifying information. Always consult User Instructions and follow local laws and regulations.

- These slides contain general information as of the date of this presentation and should not be relied upon to make specific decisions. Completing this program does not certify proficiency in safety and health. No warranties are made, as this program only presents suggested procedures that may be applicable for work in these environments.

- Information is current as of June 2016. Requirements can change in the future.
Agenda

- Why Fit Test
- Fit Test Basics – Regulatory Overview
- OSHA Methods
- Fit Test Preparation
- Qualitative (QLFT) Fit Testing Protocols Using Saccharin or Bitrex™
  - Sensitivity Test
  - Fit Test
Why Fit Test?
Why Fit Test

Demonstrate to the wearer:
• They can achieve an acceptable fit
• That respirator can be effective

How a proper respirator fit feels – so they can repeat it in the workplace:
• Location and feel on nose
• Location and feel on chin and cheeks
• Tightness of straps, tightness on face

OSHA compliance

It’s their health!

https://research.archives.gov/id/46905
Fit Test Basics – Regulatory Overview
Key Elements of Written Respiratory Protection Program

- Written worksite-specific procedures for:
  - Respirator selection
  - Medical evaluations
  - Use of respirators
  - Maintenance and care
  - Assuring adequate air quality
  - Training and fit testing
  - Program evaluations
- Requires a program administrator
OSHA-Accepted Qualitative (QLFT) Fit Test Protocols

**Saccharin** 3M Kit Part Number: FT-10 or FT-20
- Requires any particulate filter (N95 or higher)

**Bitrex™ (Denatonium Benzoate)** 3M Kit Part Number: FT-30
- Requires any particulate filter (N95 or higher)

**Isoamyl Acetate (i.e. Banana oil)**
- Requires an Organic Vapor cartridge

**Irritant Smoke**
- Requires a 100 Class Particulate Filter
What Respirators Require Fit Testing

All tight-fitting respirators

- Negative pressure disposable or reusable
- Supplied Air
- PAPR
- SCBA

NOT REQUIRED for loose-fitting facepieces, hoods or helmets on PAPR/SAR systems (e.g. TR-300 with S-433 or V-100 with M-407)
What Respirators Require Fit Testing

Each different model/size of facepiece used by worker must be fit tested.

Tight fitting facepieces with supplied air or PAPR
- Reconfigure to negative pressure facepiece (with filters)
- OR turn off PAPR motor blower

Note: quantitative fit testing (e.g. with Portacount™ or Quantifit®) is required if user needs to claim assigned protection factor of 50 on full facepieces with cartridges or filters. Otherwise with qualitative fit testing, can only claim APF of 10.
Where respirator use is not required - Voluntary Use

An employer may provide respirators at the request of employees or permit employees to use their own respirators, if the employer determines that such respirator use will not in itself create a hazard.

WHAT TO CONSIDER: Is it Voluntary?
• An exposure assessment has been conducted;
• The PEL is not exceeded
• No OSHA regulation requires that respirators be provided by the employer (e.g. abrasive blasting, TB);
• The employer does not believe it is necessary to reduce exposures below their current levels;
• The employer does not require, recommend, encourage or suggest that respirators be used;
• Workers ask to wear respirators;
• The respirators will not be used for emergency response or escape.

1910.134(c)(2)
Voluntary use: where respirators are not required
- fit testing not OSHA required, but 3M recommended

Elastomeric Facepiece

- Medical evaluation
- Cleaning, storing and maintenance
- Minimal training, i.e. Appendix D
- Any other training needed to prevent the respirator from posing a hazard to the wearer

Filtering Facepiece

Minimal training, i.e. Appendix D
Appendix D to Sec. 1910.134 (Mandatory) Information for Employees Using Respirators When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.

2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.

3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.

4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.
Who Can Fit Test

OSHA Standard for Respiratory Protection
29 CFR 1910.134

Appendix B  Employer shall ensure that the persons administering the qualitative fit test is able to prepare test solutions, calibrate equipment, and perform tests properly, recognize invalid tests, and ensure that the test equipment is working properly.

Anyone with “appropriate knowledge” and “experience” is qualified to conduct fit testing. **No formal course work or certification required.**
When To Do Fit Testing

**After** medical evaluation is completed and **before** use in the workplace

**Whenever** a different make, model or size respirator is used

**Change** in employee’s facial shape from accidents, surgery, dentures, piercings, excessive weight loss or gain

**Employee** feels respirator isn’t fitting properly

**Annually** – if not done sooner
OSHA-Accepted Fit Test Protocols
(29 CFR 1910.134 Appendix A)
Quantitative (QNFT) vs. Qualitative (QLFT)

Quantitative - PortaCount, Quantifit
- Computer controlled.
- Numerical result.
- Objective response independent of wearer.
- Half face APF = 10.
- Full face APF = 50.
- Record keeping software.
- Calibration and maintenance.
- One person at a time.
- Expensive ($8000+).
- Wearer must trust the machine.

Qualitative - Bitrex, Saccharin, Irritant Smoke, Banana Oil
- Human administration.
- Pass / Fail only.
- Subjective response dependent on wearer.
- Half and Full face APF = 10.
- No automated record keeping.
- No calibration, minimal maintenance.
- Multiple tests can be conducted simultaneously.
- Inexpensive ($300 kit; $20 hood).
- Wearer can verify test result.
Fit Test Preparation
Before the Fit Test

✓ Send out a notice several days before the fit testing:
  • Sufficient notification – allow for questions
  • Males: clean-shaven on the day of the fit testing
  • Notify subjects to avoid eating, chewing gum, smoking or drinking for 15 minutes prior to the session

✓ Medical evaluation complete

✓ The supply of respirators should include several models/sizes available for testing:
  • Allows wearer to make respirator their choice
  • Plan B if failure on initial model

✓ Training Component
3M Sales Representatives will not conduct fit tests on people wearing negative pressure respirators

• that have facial hair (well trimmed moustaches and sideburns that do not protrude under the face seal or interfere with valve function are acceptable) or,

• that have not been medically evaluated for their ability to use a respirator
## Facial Hair – Which Respirator May Be Acceptable?

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</table>

- Santa: ![Respirator](image5) (Acceptable)
- Lincoln: ![Respirator](image6) (Acceptable)
- Wilson: ![Respirator](image7) (Acceptable)
- Washington: ![Respirator](image8) (Acceptable)
Logistics

Location for fit test:
• Private area away from work and foot traffic
• Accessible
• Free from airborne contaminants
• Hand washing facilities and drinking water nearby
• Waiting area for test subjects

Room set up (traffic flow)
• Admin – Sensitivity – Conditioning/Fit test – Documentation – Exit

All supplies assembled
• Sign in forms, cards, cleaning equipment, respirators, pens
• (Optional) Razors and shaving cream
Qualitative (QLFT) Fit Testing Protocols Using Saccharin or Bitrex™
Fit Test Procedures For 3M FT-10, FT-20, and FT-30

The following training is for the following 3M fit test apparatus only:

- FT-10
- FT-20
- FT-30

Procedures for Isoamyl Acetate (i.e. Banana oil) and irritant smoke are different; the procedures in this presentation must not be used for these tests.

Refer to 29 CFR 1910.134 Appendix A for suggested procedures.
Respirator Considerations

Both the Bitrex™ and Saccharin test require the use of particle filters – either 95 or 100 level.
Fit Test Equipment – What’s in the Kits

- Fit Test Hood
  - Hood
  - Collar

- Nebulizers

- Fit Test Solutions
  - Sensitivity
  - Fit Test
Equipment Assembly

- Hood and collar
  - Drawstring aligned with track

- Two nebulizers
  - O-ring, insert.
  - Remove plugs
  - Fill with ~1 mL solution
  - Red = Sensitivity solution
  - Black = Fit test solution

- CHECK – visually confirm cloud

Note: if saccharin fit test solution crystalizes, warm bottle and shake to dissolve crystals
Sensitivity Test
Sensitivity Test

Purpose: Ensure that the wearer is able to taste challenge agent and know what to taste for.

Fill SENSITIVITY nebulizer with SENSITIVITY solution.
NOTE: Both have RED labels.

Instructions to subject:
• Don hood but not respirator.
• Open mouth and extend tongue slightly.
• Continue to breathe through mouth during the test.
• Indicate when agent is first tasted.
Sensitivity Test

Insert the nebulizer into the hood.

Sharply and fully squeeze nebulizer and count number of squeezes until the person signals they taste the agent.

Assign sensitivity level:
• Tastes between 1 and 10 squeezes = 10
• Between 11 and 20 squeezes = 20
• Between 21 and 30 squeezes = 30
Sensitivity Test

If wearer can not taste after 30 squeezes, visually confirm aerosol is being generated.

If no aerosol is visible, disassemble nebulizer, rinse all parts with hot water. Reassemble, refill and retest.

If aerosol is visible, wearer cannot use this challenge aerosol. Use alternative – Bitrex™ or saccharin.
Fit Test
Conditioning

Optional drink of water (no soda or coffee!) to remove taste of sensitivity solution from mouth.

Wearer dons respirator and passes user seal check:

• Negative Pressure Seal Check
• Positive Pressure Seal Check

Tip: Have user instructions and a mirror available

Continue to wear respirator for 5 mins prior to start of test:

• Prevents over-tightening (to point of discomfort) in order to pass
• Allows seal to establish
Be Familiar with User Instructions
Talking Points during 5-Minute Wait

Mechanics of fit test
• Taste test, not smell.
• Must breathe with your mouth open throughout.
• Respirator effectively filters out the aerosol.
• So if you taste the flavor you just tasted (same intensity), that means there’s a leak around perimeter of respirator. Please let me know immediately if you taste it.

Details of fit test
• Will add aerosol to hood every 30 seconds for entire fit test.
• Subject will perform 7 exercises for 60 seconds each
  • Demonstrate, explain the pace is slow and steady
Fit Test

Fill the **Fit Test nebulizer** with **Fit Test solution**. Both have black labels.

Prior to each new test, away from test area, make one squeeze to visually confirm aerosol is generated.

If no aerosol is seen, clean nebulizer as noted earlier.
Fit Test

• Place hood on wearer’s head. Instruct to open mouth and breathe through mouth
• Instruct subject to indicate if they taste test solution like they did during sensitivity test
• Use the **Fit Test solution and nebulizer**, not the sensitivity solution
• Insert nebulizer into hole in hood
• Squeeze nebulizer bulb per chart on next slide to generate test aerosol
## Fit Test

- Do not squeeze directly at facepiece. Aim off to one side.
- After initial aerosol is generated, start exercises.
- Renew aerosol every 30 seconds per chart.
- DO NOT short the time or the number of squeezes.

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<tr>
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<td>10 squeezes to start test</td>
<td>20 squeezes to start test</td>
<td>30 squeezes to start test</td>
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<tr>
<td>5 squeezes every 30 seconds during test</td>
<td>10 squeezes every 30 seconds during test</td>
<td>15 squeezes every 30 seconds during test</td>
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Fit Test

Series of 7 exercises – start after initial aerosol generation.

Continue each exercise for 60 seconds:

1. Normal breathing
2. Deep breathing
3. Head side to side – inhale at each far point
4. Head up and down – inhale at up position
5. Talking – rainbow passage or count back from 100
6. Bending at the waist, or jogging in place
7. Normal breathing

Additional aerosol injected every 30 seconds.
Fit Test
During the test:
• Remind person to breath through open mouth and taste air
• Regenerate aerosol every 30 seconds
• Ask the subject often if anything is tasted

Stop the test immediately if the subject:
• Reports taste of test aerosol (test failure)
• Has difficulty breathing
• Appears anxious or claustrophobic

Fit Test Instructional Video:
https://www.youtube.com/watch?v=Syj_zeNtLG
Passing Test

If subject doesn’t taste Bitrex™ or saccharin aerosol, then test passed

Suggestion:
Prior to removing hood and respirator, have subject pull respirator away from their face

They will taste test substance and know respirator really works
Passing Test

If wearer passes test, prior to removing respirator, ensure they carefully note:

- Location and feel on nose.
- Location and feel on cheeks.
- Feel of straps, tightness on face.
- Location and feel on chin.

Use a mirror to see the respirator position on face.

Emphasize wearer wants the same feel and look each time.
Test Failure Options

Have subject rinse their mouth and wait 15 minutes
- THEN -
Re-don respirator and re-adjust facepiece. Try test again
- OR -
• Different size respirator
• Different model
• Different type of respirator (e.g. full facepiece instead of half facepiece)
• PAPR or supplied air with loose fitting headgear
Multiple Test Subjects

- Multiple tests (5 max) can be run simultaneously. Any more and control is lost
- Line subjects up
- Start one after another
- Continue to rotate through the line until complete
- Maintain appropriate timing and number of squeezes
Documentation of Test

• Date of fit test
• Name of fit tester
• Name of person being fit tested
• Type of fit testing and agent used
• Make, model and style and size of respirator
• Results
• Comments

Employer needs to keep records at least until next fit test
RESPIRATOR FIT TEST RECORD

Fit testing conducted in compliance with OSHA Standard 1910.134(F).

If other local, state or federal regulations apply (such as MSHA), you may list them here:
______________________________________________________________________

Company: _____________________________________________
Address: _____________________________________________
City: __________________ State: _______ Zip: _______ Tel: __________

Name of Fit Tester: _______________________________________
Signature: _____________________________________________

Type of OSHA accepted fit test protocol used:  (Qualitative):   ___Saccharin   ___Bitrex™   ___Isoamyl Acetate   ___Irritant Smoke

(Quantitative): Portacount Model #______________  Occupational Health Dynamic Model #:____________

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<th>Name (please print)</th>
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<th>Respirator Fit Tested (Make, Model, Style, Size)</th>
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Comments: ____________________________________________________________

______________________________________________________________________
Conclusion of Fit Test Session

- Empty nebulizers into sink. Do not return liquid to bottles
- Rinse all internal parts of nebulizers in hot water to remove all solution
- If using saccharin solutions, clean nebulizers at least every 4 hours. Use wire plungers (included in kit) as necessary
- Air dry before returning to storage case
- Wipe down hood interior and allow to air dry
On-line Fit Testing Resources

Guidance for Establishing a Respiratory Protection Program
• http://solutions.3m.com/wps/portal/3M/en_US/PPESafetySolutions/PPESafety/Resources/Training/RespiratoryProgram/

Fit Testing FAQs
• http://multimedia.3m.com/mws/media/973364O/3m-respirator-fit-testing-frequently-asked-questions-faq.pdf?fn=TDB%20228%20Fit%20Test%20FAQs.pdf

On-line Medical Evaluation
• http://www.respexam.com/
On-line Fit Testing Resources

3M Fit Testing Technical Data Bulletin #165

http://multimedia.3m.com/mws/mediawebserver?mwsId=66666UF6EVsSyXTt48TEoxM6EVtQEVs6EVs6EVs6E666666--&fn=TDB_165.PDF

Fit Testing Video

http://solutions.3m.com/wps/portal/3M/en_US/PPESafetySolutions/PPESafety/Resources/SafetyServices/RespiratorFitTest/

Respirator Fit Test Record Form

http://multimedia.3m.com/mws/mediawebserver?66666UuZjcFSLXTrMxTV48&cEVuQEcuZgVs6EVs6E666666--

OSHA Fit Test Protocols

Thanks for Listening and Watching!

Any Questions???
FAQ

If I am required to wear the respirator, (i.e. exposure above the PEL) and have a beard but still pass the fit-test can I keep the beard?

• No. There is no exception to the facial hair/face seal surface restriction. OSHA Letter of Interpretation 10/03/1996

If I bring my personal respirator to work and am required to wear it because of an exposure above the PEL, do I still need to pass the fit-test?

• Yes. The employer is responsible for the functionality and appropriateness of all respirators used in their facility. If respirators are not required and the use is voluntary a fit test is not required.
FAQ

If the respirator is used strictly voluntary – no airborne contaminant hazard, and no employer requirement to wear – is a fit test still required?

• No. OSHA Letter of Interpretation 03/29/2004. However medical evaluation may still be required depending on the specific situation.

How long must I keep fit test records?

• 29CFR1910.134(m)(2)(ii) only requires fit test record be kept until the next fit test is completed. Employers may keep longer if desired.
FAQ

Can 3M 504 respirator wipes be used to clean fit-test respirators between multiple fit tests?
• Yes. However respirator must be fully cleaned per regulations at the end of each day. OSHA Letter of Interpretation 10/01/1999.

Can a qualitative fit-test be used to fit test a tight fitting PAPR or SAR and still have an APF of 1000?
• Yes. PAPR or SAR facepiece must be tested in the negative pressure mode. OSHA Letter of Interpretation 07/23/2007
FAQ

Can I do the fit test before the medical evaluation?
• No. A satisfactory medical evaluation must be made before any fit testing. OSHA Letter of Interpretation 03/05/1999

If worker leaves the employer can they get a copy of their fit test record?
• Yes. 29CFR1910.134(m)(4) requires fit test records be made available to the employee for inspection and copying. Record must include: Employee name; Type of fit test; Specific make, model, style, size of respirator; Test date; Pass/Fail result for qualitative test or fit factor for quantitative.
For Further Information


3M Website – www.3M.com/PPESafety.
**RESPIRATOR FIT TEST RECORD**

Date:________________

Fit testing conducted in compliance with OSHA Standard 1910.134(F).  
If other local, state or federal regulations apply (such as MSHA), you may list them here:  
______________________________________________________________________

Company:___________________________________________

Address:___________________________________________

City:_______________________________________________

State:_________Zip:_________Tel:_____________________

Name of Fit Tester: _________________________________

Signature: _________________________________________

Type of OSHA accepted fit test protocol used:  
(Qualitative):   ___Saccharin   ___Bitrex™   ___Isoamyl Acetate   ___Irritant Smoke

(Quantitative): Portacount Model #_________________ Occupational Health Dynamic Model #:_________________

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Technical Data Bulletin

# 228 – Fit Testing: Frequently Asked Questions

Published: April 2014

**Background**

Fit testing is a required component of any respiratory protection program in which workers are required to wear tight-fitting respirators. Qualitative fit testing is an acceptable method in many cases. (See the section titled “Fit Test Regulatory Requirements” for more information about when qualitative fit testing is acceptable.) 3M’s three qualitative fit test kits meet OSHA’s performance criteria for fit testing respirators under 29 CFR 1910.134, Appendix A. Two of these kits, FT-10 and FT-20, contain the solutions specified by the Saccharin Solution Aerosol Protocol; the other, FT-30, contains the solutions specified by the Denatonium Benzoate Solution Aerosol Qualitative Fit Test Protocol.

This document contains answers to questions that many of our customers ask.

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Fit Test and Sensitivity Solutions........ Pg. 1
Saccharin Solutions ...................... Pg. 2
Bitter Solutions......................... Pg. 3
Nebulizers.................................. Pg. 3
Hoods and Collars ........................ Pg. 3
Fit Test Regulatory Requirements...... Pg. 4
Qualitative Fit Test Protocol .............. Pg. 5

**3M Fit Test Kits**

**Q:** How many fit tests can be conducted with one 3M qualitative fit test kit?

Approximately 150 fit tests can be conducted before you need to re-order fit test kit solutions. Note, however: the number of people you can fit test with one set of bottles varies depending on how many people you fit test in each session and what their sensitivity thresholds are (10, 20, or 30). When you first fill the nebulizers, you should use 1 tsp of solution. You might only need to fill the sensitivity nebulizer once per fit test session. If you fit test more than 20 people in each fit test session, you will need to fill your fit test nebulizer multiple times and will run out of fit test solution earlier than you run out of sensitivity solution. The nebulizers should be emptied, rinsed, and refilled at least once every 4 hours, per OSHA 29 CFR 1910.134.

**Q:** Can we fit test non-3M respirators with a 3M fit test kit?

Yes, you can use 3M fit test kits to fit test non-3M respirators. The qualitative fit test protocol is specified by OSHA in 29 CFR 1910.134 Appendix A. 3M’s fit test kit components meet the requirements of that standard. Therefore, it can be used to fit test any NIOSH-approved tight-fitting facepiece. You can also use non-3M fit test kits to fit test 3M respirators, as long as these fit test kits meet the specifications in OSHA’s fit test standard.

**3M Fit Test and Sensitivity Solutions**

**Q:** What is in the fit test kit solutions?

All 3M qualitative fit test solutions are prepared according to OSHA 29 CFR 1910.134 Appendix A, which specifies the solutes and concentrations that are required for compliance. The sweet solutions in the FT-10 and FT-20 kits contain sodium saccharin.
Sodium saccharin is commonly used as an artificial sweetener in many commercially available beverages and foods. The bitter solutions in the FT-30 kit contain denatonium benzoate, which is often marketed under the brand name Bitrex™. Denatonium benzoate is used as a taste aversion agent to prevent children from ingesting certain household products and is endorsed by the American Medical Association, the National Safety Council, and the American Association of Poison Control Centers.

**Q: Do the fit test and sensitivity solutions expire?**

There is no published shelf life for the solutions. Any solution left in the nebulizers at the end of your fit test session should not be poured back into the bottles but rather should be discarded to avoid contamination of the solution remaining in the bottle.

**Q: There is a white powdery solid around the cap of the solution. Should I be concerned?**

White crystals will form around the cap if it is not sealed tightly to the bottle. This is true for both the sweet solutions and the bitter solutions. It occurs because the solutions are very concentrated, and if drops of the solutions leak out of loose lids, the water evaporates, leaving crystals of the sweet or bitter solute. It is not cause for concern and can simply be wiped away for appearance and convenience.

**Q: What is in the fit test kit solutions?**

All 3M qualitative fit test solutions are prepared according to OSHA 29 CFR 1910.134 Appendix A, which specifies the solutes and concentrations that are required for compliance. The sweet solutions in the FT-10 and FT-20 kits contain sodium saccharin. Sodium saccharin is commonly used as an artificial sweetener in many commercially available beverages and foods. The bitter solutions in the FT-30 kit contain denatonium benzoate, which is often marketed under the brand name Bitrex™.

**Bitter Solutions**

**Q: How can you help subjects remove the bitter taste from their mouths after the fit test?**

The taste of denatonium benzoate can be countered with chocolate. Many fit testers offer chocolate to subjects, but this should be done only after the entire fit test protocol is complete.

**Saccharin Solutions**

**Q: There are solids at the bottom of the bottle of sweet solution. Should I be concerned?**

The fit test solution is a highly saturated solution per the concentration specified in OSHA 29 CFR 1910.134, Appendix A, Saccharin Solution Aerosol Protocol. The FT-12 may crystallize under certain storage conditions, such as if the temperature is lowered. Per the instructions included with the 3M FT-10 Qualitative Fit Test Apparatus, if crystals are present, hold the closed bottle under a warm stream of water and shake vigorously to dissolve back into solution.

**Q: During the sensitivity test, no subjects are able to taste the sweet solution. What should I do?**

Check to make sure your nebulizers are generating aerosol when squeezed. Hold them against a solid dark background so you can see if a cloud of aerosol appears when you squeeze the nebulizer. If no white aerosol cloud appears, perform the following steps:
1. Make sure both white plugs are removed from the nebulizer openings (Fig. A).
2. Make sure the question-mark-shaped insert is present in the nebulizer reservoir (Fig. B) and is pushed down as far as possible on the stem.
3. Verify that the black O-ring is present in the reservoir (Fig. A).
4. The sweet solutions can crystallize on certain parts of the nebulizer, causing it to not function properly. Even if you wash your nebulizers frequently, crystals can remain in the two narrow tubes in the nebulizer (Fig. B). Your fit test kit came with a curl of small-gauge wire that should be used to ensure those narrow tubes are clear of crystals. If you no longer have your wire, contact 3M for a replacement.

See steps 1 – 4 in the answer to the question on Pg. 2 about sensitivity testing with saccharin.

**Q: I lost the small plastic question-mark-shaped insert that affixes to the nebulizer reservoir. Can I order a replacement?**

The inserts are non-orderable components. If you need replacements, please call the US Technical Service Helpline at 1-800-243-4630.

**Q: I lost the black O-ring for my nebulizer. Can I order a replacement?**

The O-rings are non-orderable components. If you need replacements, please call the US Technical Service Helpline at 1-800-243-4630.

**Q: How should I clean my fit test kit components?**

Nebulizers should be rinsed in fresh water after every session or at least every four hours, or if the nebulizer becomes clogged. If you use the sweet solutions, we recommend periodically using the curl of small-gauge wire that came with your fit test kit to remove any crystals that might have formed in the two narrow passageways indicated in Fig. B. Always discard any unused solution.

**Figure A. Nebulizer components.**

**Figure B. Locations of two narrow passageways that must be cleaned with small-gauge wire.**

**Nebulizers**

**Q: I noticed my nebulizer is not producing aerosol. What should I do?**
Hoods and Collars

**Q: Should I worry about the oxygen levels inside the hood during the fit test?**

Oxygen deficiency immediately dangerous to life or health is defined as oxygen content below 19.5% at sea level. We have performed a limited amount of testing on the oxygen levels inside the fit test hood. It is not abnormal to see the oxygen level in the hood temporarily decrease during the exhalation phase of breathing. However, based on our experience, the oxygen levels during the inhalation phase do not pose any significant threat to healthy individuals.

**Q: How should I clean the hoods and collars?**

After each session, the hood and collar should be wiped with a damp cloth or paper towel to remove any deposited fit test solution. If desired, the hood and collar can be wiped with 3M™ Respirator Cleaning Wipes 504 between individuals or between fit test sessions. If non-disposable respirators are used to fit test multiple subjects, the respirators should be cleaned with 3M™ Respirator Cleaning Wipes 504 between each individual.

### Qualitative Fit Test Protocol

**Q: What is the difference between a qualitative and a quantitative fit test?**

OSHA specifies approved procedures for both qualitative fit testing (QLFT) and quantitative fit testing (QNFT). There are several methods of QNFT – some involve measuring the concentration of an aerosol challenge both inside and outside the facepiece; others involve measuring the seal of the respirator by creating a vacuum inside the facepiece. All four OSHA-approved QNFT methods yield a numerical value called a Fit Factor, which represents the ratio of the concentration outside the facepiece to the concentration inside the facepiece – i.e., the reduction in the airborne

<table>
<thead>
<tr>
<th>Qualitative Fit Testing (QLFT)</th>
<th>Quantitative Fit Testing (QNFT)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pass/fail criteria</strong></td>
<td>Pass if subject does not taste challenge.</td>
</tr>
<tr>
<td><strong>Tester</strong></td>
<td>Pass if required fit factor is achieved – specified for each respirator class.</td>
</tr>
<tr>
<td><strong>Subject participation</strong></td>
<td>Subject must perform 7 exercises. No response needed; machine calculates result.</td>
</tr>
<tr>
<td><strong>Acceptable challenges</strong></td>
<td>- Aerosol: Sodium chloride, corn oil, etc. OR - Controlled negative pressure (vacuum conditions)</td>
</tr>
<tr>
<td>- Aerosol: Denatonium benzoate (bitter), sodium saccharin (sweet), stannic chloride (irritant smoke); OR - Vapor: isoamyl acetate (banana oil)</td>
<td></td>
</tr>
<tr>
<td><strong>Time requirement</strong></td>
<td>Must fit test one person at a time per machine.</td>
</tr>
<tr>
<td><strong>Type of respirator or filter required</strong></td>
<td>Particulate respirator or filters are required for methods using aerosol challenges; organic vapor respirators or cartridges are required for the isoamyl acetate method.</td>
</tr>
<tr>
<td>No</td>
<td>Particulate respirator or filters are required for aerosol challenges; adapters are required to achieve vacuum conditions.</td>
</tr>
<tr>
<td><strong>Probed facepiece or adapter required</strong></td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Table 1. Some differences between qualitative and quantitative fit testing.**
concentration of the contaminant. QLFT, on the other hand, yields either a pass/fail result, depending on whether the subject reports detecting the challenge during the fit test. Regulatorily, either QNFT or QLFT can be used for most classes of respirator, including disposable filtering facepieces; however, quantitative fit testing is required for full facepieces used in negative-pressure configurations if the assigned protection factor (APF) of 50 is required (i.e., if airborne concentrations of contaminants exceed 50 times the occupational exposure limit). Table 1 summarizes some of the differences between QLFT and QNFT.

**Q: How many people can I fit test at once?**

In most cases, up to 5 people can be fit tested simultaneously by one fit tester. If all your subjects have a sensitivity threshold of 10 (they taste the sensitivity solution during the first 10 squeezes), you will begin the fit test by inserting 10 squeezes into each person’s hood. This must be accomplished within the first 30 seconds of the fit test so you can administer the next round of squeezes (5 apiece in this scenario) at the 30-second mark, to meet the requirements of the OSHA QLFT protocol. It takes approximately 6 seconds to perform 10 full squeezes. Therefore you can fit test a maximum of 5 individuals at one time (5 people x 6 seconds = 30 seconds). If any subjects have a higher sensitivity threshold than 10, you will probably need to decrease the number of subjects, as more total squeezes will be required.

**Q: How long does each exercise last? How long does a fit test last?**

Each exercise lasts 60 seconds. There are 7 exercises in the fit test, so a properly administered fit test lasts a minimum of 7 minutes. Keep in mind that the entire qualitative fit test procedure includes the sensitivity test, donning, and performing user seal checks – in addition to the fit test itself – so the entire event will require at least 15 minutes of each subject’s time.

**Q: What if an individual doesn’t taste the sensitivity solution after the first 10 squeezes?**

Per the OSHA fit test protocol, administer 10 more squeezes, for a total of 20. If the subject still does not taste the solution, administer 10 more squeezes, for a total of 30. If they still don’t taste it, they are deemed insensitive to that challenge, and you must try an alternative. (If the challenge is the bitter solution, you may switch to the sweet solution, and vice versa.)

**Q: Why must I continue to inject the fit test aerosol into the hood every 30 seconds throughout the fit test exercises?**

As the subject breathes the aerosol-laden air through the respirator filter, they effectively clean the air. After 30 seconds, more aerosol must be injected in order to restore the airborne concentration to its original level. This OSHA-approved protocol was validated to maintain an acceptable concentration of aerosol inside the hood throughout the fit test.

**Q: What should I do if someone tastes the challenge during the fit test?**

Stop the fit test for that person. Ask them to remove the hood and the respirator. (If you are fit testing more than one person simultaneously, finish the fit test for the rest of the subjects.) Work with the person to determine why they failed – examine their donning technique, fit, the respirator, etc. Ask them to re-don the respirator or try a different model or size. Since they may have tasted a high concentration of the fit test solution, encourage them to get a drink of water. When they are ready to be tested again, you must begin the entire procedure again, starting with the sensitivity test and then completing an entire fit test.
Fit Test Regulatory Requirements

**Q: When is qualitative fit testing an acceptable fit test method? When is quantitative fit testing required?**

According to 29 CFR 1910.134, qualitative fit testing is an acceptable method for tight-fitting facepieces used in negative-pressure and positive-pressure configurations, with a few exceptions:

- The assigned protection factor of 50 is needed while using a full facepiece in negative-pressure air-purifying mode.
- A supplied-air respirator (SAR) or self-contained breathing apparatus (SCBA) is used in demand mode (currently very uncommon and distinct from pressure-demand mode).
- Facepieces used in SCBAs for structural firefighting must be quantitatively fit tested, per the National Fire Protection Association.

**Q: Are there any respirators that don’t require fit testing?**

Loose-fitting facepieces, hoods and helmets, which are all used in positive-pressure configurations, do not depend on a tight seal with the face to provide protection and therefore do not need to be fit tested. Furthermore, per OSHA, disposable filtering facepiece respirators that are used in voluntary use situations do not need to be fit tested. Refer to Regulations Update #21 for information on OSHA’s requirements when respirators are worn voluntarily.

**Q: Who can conduct medical evaluations related to fit testing?**

The evaluation must be performed by a physician or other licensed health care professional (PLHCP), per OSHA 29 CFR 1910.134. This may include a variety of health care professionals, depending on the scope of practice permitted by each state’s licensure.

**Q: What is a medical evaluation?**

OSHA requires that employees be determined to be medically able to use a respirator before being fit tested, both in mandatory and voluntary use situations. The employer must supply the medical evaluation at no cost to the employee. Many occupational health clinics offer this service. The evaluation must be performed by a PLHCP, as stated above. During the evaluation, the PLHCP must collect certain information from the employee, which is specified in 29 CFR 1910.134 Appendix C. Additionally, the employer must provide certain information regarding the employee’s work conditions to the PLHPC, which is specified in 29 CFR 1910.134(e)(5)(i). If deemed necessary by the PLHCP, a follow-up exam may be scheduled.

**Q: Do I have to be certified to conduct fit testing?**

No, OSHA does not require any specific certification for fit testers. In 29 CFR 1910.134 Appendix A, OSHA says, “The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order.”

**Q: Does the fit test subject need to be clean-shaven?**

Per OSHA, employees wearing respirators must be clean-shaven, including during the fit test. No facial hair may be present that interferes with the respirator seal. Many companies and fit testers create policies regarding shaving for fit tests. For example, in order to hold a position where respirator use is required, an employee must come to work clean-shaven. Or if the work is predictable, the
employee must be clean-shaven any day when a respirator will need to be worn – including fit testing. 3M employees will not fit test someone who is not clean-shaven.

**Q: How should I document my fit testing?**

A. OSHA requires that the employer keep records that include the name or employee number; the type of fit test performed; the make, model, and size of the respirator; the date of the test; and pass/fail results for QLFT or numerical results for QNFT. This information needs to be retained until the date of the next fit test administered to that individual. 3M offers downloadable forms that can be completed and kept on file to meet these requirements. The forms can be found on the 3M website, along with other fit testing resources, including a downloadable wallet card. Although OSHA does not require a wallet card, employees must know which respirator make, model, and size they should be wearing. Wallet cards are one way to help ensure employees will always have quick access to that information.
Respiratory Fit Test

Name: ___________________ ID#: ___________________

Company: ___________________

was successfully fit tested in:
- Manuf.: __________ Model: __________ S  M  L  QLFT/QNFT
- Manuf.: __________ Model: __________ S  M  L  QLFT/QNFT
- Manuf.: __________ Model: __________ S  M  L  QLFT/QNFT

Fit Tester: ___________________

You must be fit tested at least annually and if you change to a different respirator model. Conduct a User Seal Check each time the respirator is put on.

Prueba de Ajuste del Respirador

Nombre: ___________________ Documento: __________

Compañía: ___________________

ha cumplido satisfactoriamente con el test de ajuste del respirador:
- Marca: __________ Modelo: __________ S  M  L  QLFT/QNFT
- Marca: __________ Modelo: __________ S  M  L  QLFT/QNFT
- Marca: __________ Modelo: __________ S  M  L  QLFT/QNFT

Responsable del test: ___________________

Usted debe realizar la prueba de ajuste por lo menos una vez al año y además si cambia el modelo de respirador. Haga la verificación de ajuste cada vez que se lo coloque.