

Why Fit Test – Select Reasons

1. Ensure user is able to obtain a proper fit.
2. Wearer buy-in.
 - They can achieve acceptable fit
 - The respirator can be effective
3. Show how 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
4. OSHA/regulatory compliance



<https://research.archives.gov/id/46905>



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

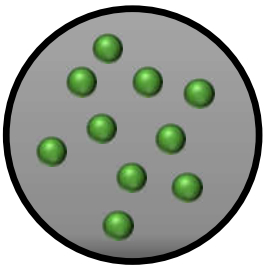


Assigned Protection Factors (APF)

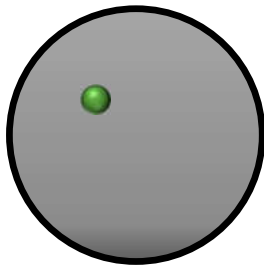
Half Facepiece Respirators = 10 APF

APF 10 = 10X reduction inside respirator

Outside
Respirator
Concentration



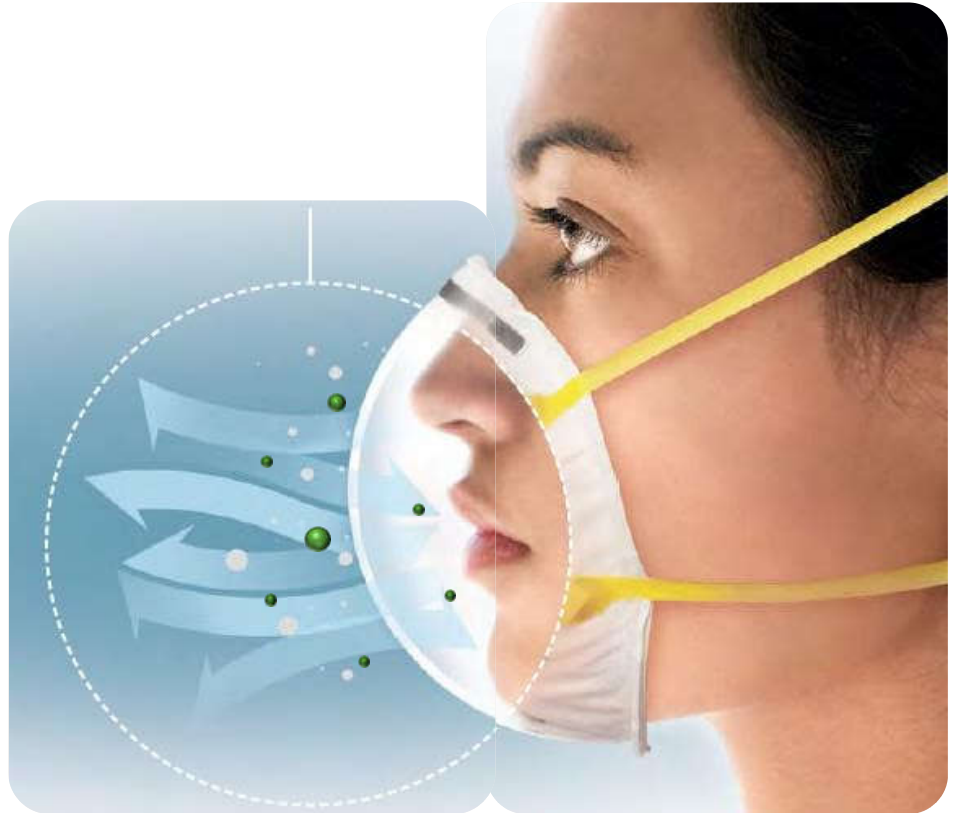
Inside
Respirator
Concentration



When fit testing negative-pressure respirators,
need to demonstrate APF x 10 (safety factor).

APF 10 x SF 10 = FF 100

APF 50 x SF 10 = FF 500



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.

1910.134(c)(2)

IS IT VOLUNTARY?

What to consider:

- 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.

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.

Discussion: Respirator Program Calendar

With 1-2 partners:

- Discuss your respirator program calendars. What works well? What needs improvement?

How often and what time of year do you do the following?

- **Medical evaluations**
 - At hire?
 - Once enrolled in program?
 - How frequently?
- **Fit testing**
 - At hire?
 - Once enrolled in program?
 - Annual repeat – on a rolling basis or all at once?
- **Respirator Training**
 - In sync with fit testing?



Who Can Fit Test

OSHA: Anyone with “appropriate knowledge” and “experience” is qualified to conduct fit testing. No formal course work or certification is required.

All Fit Test Administrators:

- Calibrate equipment
- Perform tests properly
- Recognize invalid tests
- Ensure that test equipment is in proper working order

Qualitative Only:

- Prepare test solutions

Quantitative Only:

- Calculate fit factors properly



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



Before the Fit Test

✓ Send out a notice several days prior to fit test:

- Sufficient notification – allow for questions
- Men: 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



www.CDC.gov/niosh/npptl/pdfs/FacialHairWmask11282017-508.pdf

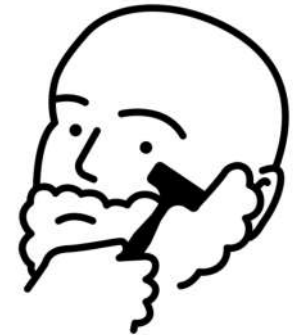
Room Setup and Facilities

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 – key for large-scale fit test sessions)

- Admin – Sensitivity – Conditioning/Fit test – Documentation – Exit
- All supplies assembled
- Sign in forms, cards, cleaning equipment, respirators, pens
- (Optional) Razors and shaving cream



Applicability

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.



Fit Test Equipment – What’s in the Kits

- Fit Test Hood
 - Hood
 - Collar
- Nebulizers
- Fit Test Solutions
 - Sensitivity
 - Fit Test



Activity - Equipment Assembly

- Hood and collar
 - Drawstring aligned with track
- Two nebulizers
 - 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.

Troubleshooting Nebulizers

What if nebulizer doesn't produce robust aerosol cloud?

1. Remove plugs to generate aerosol.
2. Check to make sure insert is present.
3. Disassemble and wash with hot water.
4. Use wire tool to break up crystals – could form in 2 locations.



Test Validity - Type of Challenge Agent

Both the Bitrex™ and Saccharin test require the use of particle filters – either 95 or 100 level.



Sensitivity Test

Purpose?

1. Ensure that the wearer is able to taste challenge agent.
2. Determine how sensitive wearer is to challenge agent.
3. Help subject understand what to taste for.

SENSITIVITY nebulizer and **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



Troubleshooting Sensitivity Testing

Scenario: Wearer cannot taste after 30 squeezes.

Troubleshooting:

1. Visually confirm aerosol is being generated.
 - If not, follow nebulizer troubleshooting guide.
2. If aerosol is visible, wearer cannot use this challenge aerosol. Use alternative – Bitrex™ or saccharin.
3. If subject is also not sensitive to alternative:
 - Use other qualitative method - banana oil, irritant smoke).
 - Use quantitative method – PortaCount, Quantifit.
 - Consider loose-fitting PAPR instead.



Fit Tests – Saccharin and Bitrex™



Between Sensitivity and Fit Tests

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

2. Wearer dons respirator and passes user seal check:

- Negative Pressure Seal Check
- Positive Pressure Seal Check

Tip: Have user instructions and a mirror available

3. “Conditioning” - Continue to wear respirator for 5 mins prior to start of test:

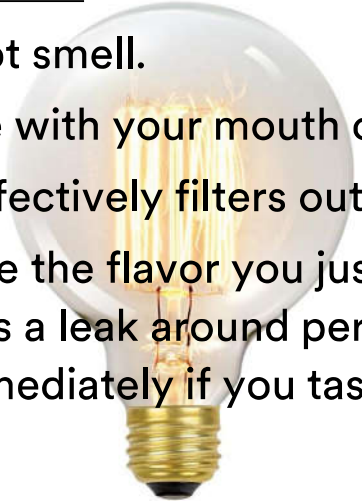
- Prevents over-tightening (to point of discomfort) in order to pass
- Allows seal to establish



Talking Points during 5-Minute Wait

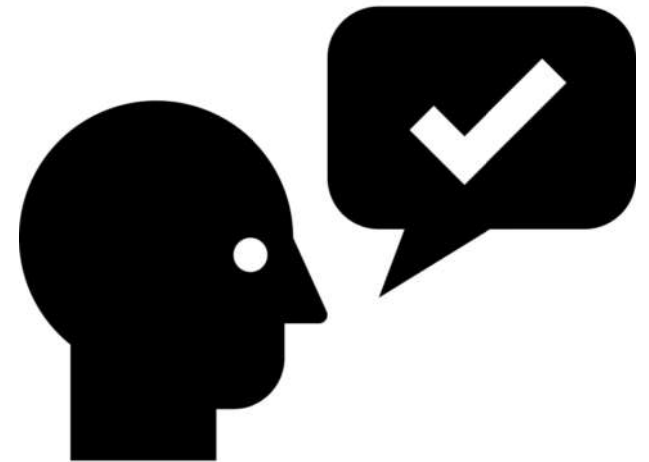
Mechanics of fit test

- 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

Fit Test nebulizer and 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

1. Place hood on wearer's head. Instruct to open mouth and breathe through mouth.
2. Instruct subject to indicate if they taste test solution like they did during sensitivity test.
3. Insert nebulizer into hole in hood.
4. 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.

Sensitivity 10 (1-10)

10 squeezes to
start test

5 squeezes
every 30
seconds during
test

Sensitivity 20 (11-20)

20 squeezes to
start test

10 squeezes
every 30
seconds during
test

Sensitivity 30 (21-30)

30 squeezes
to start test

15 squeezes
every 30
seconds
during test

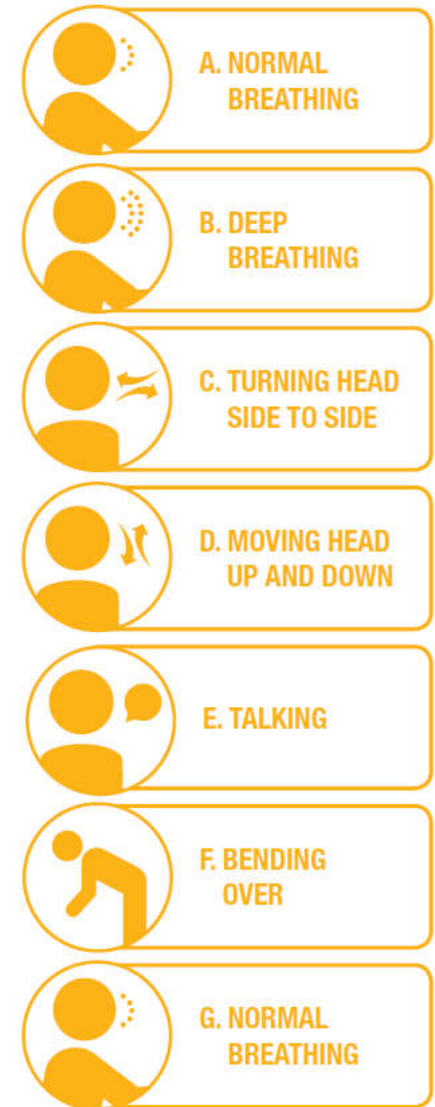
Fit Test

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

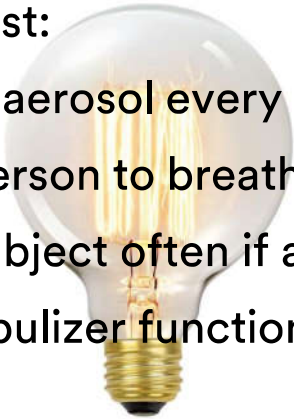
Additional aerosol injected every 30 seconds.



Fit Test

During the test:

- Replenish aerosol every 30 seconds
- Remind person to breath through open mouth and taste air
- Ask the subject often if anything is tasted
- Check nebulizer function visually



Stop the test immediately if the subject:

- Reports taste of test aerosol (test failure)
- Has difficulty breathing or appears anxious or claustrophobic

Fit Test Instructional Video:

https://www.youtube.com/watch?v=Syj_zeNtLGI



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.



Fit Test – Hands on

Series of 7 exercises – start after initial aerosol generation.

No	Exercise	Time (s)	Squeezes
1	Normal breathing	30	N = sensitivity threshold
		30	½ N
2	Deep breathing	30	½ N
		30	½ N
3	Head side to side (<i>inhale at each side</i>)	30	½ N
		30	½ N
4	Head up and down (<i>inhale at up position; exhale at down</i>)	30	½ N
		30	½ N
5	Talk audibly	30	½ N
		30	½ N
6	Bend at the waist	30	½ N
		30	½ N
7	Normal breathing	30	½ N
		30	½ N



Remember:

- Remind subjects to breathe through mouths.
- Ask often if they taste the aerosol inside the respirator.
- Check to make sure nebulizer is producing aerosol cloud.

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



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



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, style & size of respirator
- Results
- Comments

RESPIRATOR FIT TEST RECORD					
Date: _____			Company: _____		
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: _____			Address: _____		
Type of OSHA accepted fit test protocol used: (Qualitative): ___ Saccharin ___ Bitrex™ ___ Isoamyl Acetate ___ Irritant Smoke			City: _____		
(Quantitative): Portacount Model # _____ Occupational Health Dynamic Model # _____			State: _____ Zip: _____ Tel: _____		
Name of Fit Tester: _____			Signature: _____		
Name (please print)	Signature	Respirator Fit Tested (Make, Model, Style, Size)	Fit Test Pass	Fail	Could not be fit tested due to:
			<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	
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			<input type="checkbox"/>	<input type="checkbox"/>	
Comments: _____					

Employer needs to keep records at least until next fit test