

Qualitative Respirator Fit Testing: Methods and Practice

These materials were developed for and presented at the 2022 MRASH Pre-Conference Workshop Tuesday, November 15, 2022, from 2:30-5 PM at Kirkwood Center Hotel, Cedar Rapids Iowa

This protocol is provided as a structured guideline for training for performing qualitative respirator fit testing, and it highlights relevant concerns for the agricultural sector. The protocol, however, is universally applicable to respirator fit testing practices.

The package includes COVID protocol guidelines suggested at the time of this meeting. Consult with current guidance on disinfection and viral transmission hazards, including current infectious transmission rates, prior to using this procedure / conducting this training.

Workshop Agenda

Qualitative Respirator Fit Testing: Methods and Practice

*Originally given Tuesday, November 15, 2022, 2:30-5 PM at
Kirkwood Center Hotel, Cedar Rapids Iowa*

The Great Plains Center for Agricultural Health (GPCAH) will present an interactive session that guides participants through the process of qualitative respirator fit testing.

We will provide an interactive session for up to **36 registered participants** who will develop hands-on skills to conduct qualitative respirator fit testing. After initial discussions to provide orientation to the process, participants will work in teams to conduct fit testing on one another using qualitative protocols. Participants will receive both hard copies and electronic materials to use and document fit testing in their community.

Why Sign Up?

- You want to understand the steps needed to complete qualitative fit testing to help farmers/rural communities select a respirator that fits and, therefore, provides protection
- You need refresher on fit testing protocols
- You want to get fit tested on a respirator you are currently wearing (must be clean shaven)

Agenda:

- Introductions and documentation review (15 min)
- Teams- will make 12 teams of three (5 min)
- Slow walk-through demonstration (30 min)
- Review of documentation from fit-test #1, Q&A (15 min)
- Hands-on team demonstrations (repeat twice, 20 min each, 40 min)
- Review and clean up (10 min)
- Post-session survey turn-in

Learning Objectives:

- Understand the components, order, and timeline to conduct a qualitative fit test that meets regulatory and best-practice recommendations to assure fit
- Demonstrate fit testing procedures
- Demonstrate ability to complete paperwork to document fit testing
- Understand that no one respirator model fits every face

Participants:

- Must be clean shaven to receive fit testing (can conduct fit testing only)
- May bring their own respirator (If using an elastomeric respirator, you must bring a P100 cartridge that fits the respirator); otherwise, FFRs (disposable N95s) will be provided
- Bring a watch/phone to set timers during testing
- You will not be fit-tested if you have a cold or COVID symptoms
- It is recommended that participants wear an N95 FFR when conducting fit testing on others during the workshop, particularly when conducting the sensitivity test.

COVID Precaution Updates for Respiratory Protection (Oct. 2022)

EPA:

The EPA Worker Protection Standard specifies **annual** fit-testing requirements for ag employers and pesticide handlers. During the height of the COVID pandemic, annual fit testing was allowed to be put on hold for those who had a fit test on file. However, in **August 2021**, EPA has terminated the temporary guidance for ag employers and pesticide handlers (cancelling June 2020 and May 2021 guidance). All pesticide applicators now require annual fit-testing, at a minimum. See: <https://www.epa.gov/pesticides/epa-sunsets-temporary-guidance-respiratory-protection-agricultural-pesticide-handlers>

FDA:

Note also that the [FDA](#) has revoked authorizations for decontaminating FFRs in hospital use and emergency use approvals for non-NIOSH approved FFRs on June 30, 2021.

Manufacturers:

Hygiene during fit-testing continues to be recommended by equipment [providers](#). The following is from the 3M hygiene guidance for QLFT:

When infectious outbreaks are of concern, the following protocol can be used to minimize cross infections.

- During fit test, **use the same hood** for a subject that was used during the sensitivity test for that subject.
- Use **one set of nebulizers for each subject being fit tested**.
- Between each fit test, *disinfect the inside surface of hoods and the outer surfaces of nebulizer nozzles*, using a disinfectant from the [list of products that meet EPA criteria for use against SARS-CoV-2](#) (the cause of COVID-19), such as wiping with 70% Isopropanol solution with 1-minute contact time or other approved disinfectants.
- At the end of the fit test session, **discard unused solution** and **clean any remaining solution** from the nebulizer, per the fit test kit User Instructions.
- During fit testing, the fit test subject must be without respiratory protection during part of the interaction, and the fit tester must be within 6 feet of the fit test subject to conduct the sensitivity and fit tests. Therefore, **organizations might consider requiring fit testers to wear respiratory protection without a valve**.

Hence, the following protocol are adopted for this volunteer training in November 2022:

- Hoods will be sanitized with Chlorox bleach sheets between users; use the same hood for sensitivity test and subsequent fit test protocols for a single individual before testing on the next participant.
- Nebulizers *will be filled minimally, with exteriors wiped down* between users with alcohol wipes
- Those **conducting** fit testing are recommended to **wear N95 FFR** throughout the procedure.

In addition, 2022 participants who have cold symptoms *will not be fit tested* (cannot sense the test solution) nor *conduct* fit testing unless they wear an N95 FFR that has no exhalation valve.

Procedure Steps – Process Quick Steps

1. Establish fit test area – Clean surfaces, clean shrouds, assemble nebulizers
2. Establish Respirator Selection and Donning area – Separate from fit test area
3. [Prepare nebulizers](#) (sensitivity test and fit test solutions)-use gloves and dispose when done
4. Welcome client at Respirator Selection Area
5. Discuss process with client – Have them select respirator they want to try
 - a. [Guidance](#) to class on face shape
6. Walk through [donning procedures](#), walk through FIT CHECK (positive/negative).
7. Wear for at least 5 minutes to assess comfort – Do not proceed if uncomfortable; select a different one (*Start filling out the form now*)
8. Once comfort is assessed, demonstrate removal of respirator
9. With respirator in client's hands, go to Fit Test Area
10. Conduct sensitivity test – No respirator on, how many puffs to sense compound (10, 20, 30, not detect) – *Write this down on their form*. Have client describe the taste and let them know this is what they will need to look for when wearing the respirator in the next stage.
11. Have client don respirator and repeat the FIT CHECK
12. Don hood, use FIT TEST SOLUTION nebulizer and charge it with the 10 / 20 / 30 puffs, as determined from sensitivity test. [Write this down](#). You will repeat this dosing every 30 seconds throughout the fit test. Start your timer
13. Have client [walk through each activity](#), 60 seconds each, in this order:
 - a. Normal breathing,
 - b. Deep breathing
 - c. Turning head from side to side (one turn every second)
 - d. Nodding head up and down (one cycle per second)
 - e. Talking ([Rainbow passage](#), recite alphabet,...)
 - f. Jog in Place
 - g. Normal Breathing
14. Throughout above: (1) repeat dosing (10/20/30 puffs) every 30 seconds inside the hood AND (2) ask if they have that same taste they experienced earlier in the sensitivity test
AT any point, if they can taste/sense the chemical, the respirator is a **fail** and it does not fit.
- 15.** At the end of step g... **KEEP THE HOOD ON**
 - a. Ask again if they can sense the chemical
 - b. Explain that you want them to briefly tip the respirator to break the seal then let it go back so it fits, quickly... Do they taste the Bitrex/SWEET solution? They should. If they do not, there is something wrong with your procedure (no solution in the nebulizer, not puffing the nebulizer sufficiently, ...). This is a failed test if they cannot sense the chemical now
16. Then, remove the Hood. They can remove the respirator... Remember that the outside is contaminated with the test solution, so don't touch the outside of it. If elastomeric, use alcohol wipes to clean it down. If FFR, put it in paper bag to off gas if want to reuse it later, otherwise throw it away. (*For class, keep the fitted respirator on.*)
17. Complete your paperwork. Send client away with information on what does and does not fit them. For FFR, send them away with suggestions for care. (COVID care is provided in the package)
18. Disinfect HOOD, exterior of nebulizer, anything contacted during the procedure
19. Do not try more than 3 respirators on a person in one session. Have them come back another day if you don't have a good fit in the first three tries.

Detailed General Qualitative Fit Test Instructions

For those being fit tested:

- Eating, drinking, smoking, chewing gum is prohibited for 15 minutes prior to this test
- Men must be clean shaved

We will only fit test N95 or better face filtering respirators – We will provide FFRs, but if you have a respirator you want to wear and test, you may. For Elastomeric Respirators (half mask or full-face), it **must have a new P100 cartridge to be tested**.

Threshold screening:

Person wears shroud and NO respirator; select nebulizer **with SENSITIVITY solution**

- Put shroud on; position it so there is 6 inches between face and window
- Inform wearer to breathe through open mouth with tongue slightly extended
- Use **10 full**, rapid squeezes of bulb with **threshold concentration (Sensitivity Solution)** into shroud, not directly at mouth
- Ask wearer to report if they taste bitterness
 - If not, **do 10** more squeezes; do this up to 30 total
 - IF they **cannot** taste Bitrex **at 30**, we cannot continue with Bitrex. Move to another solution (here: “Sweet” = SACCHARINE). Have the wearer keep the hood on, but we now use different chemicals
- Write down the number of squeezes (10, 20, 30, or NOT SENSITIVE) on the [individual’s log](#)

Wearer:

- Takes off hood and puts it on table (no one touches this until we finish with this person-COVID protocols)
- Selects respirator to wear
 - Smaller faces, suggest starting with **flat fold**
 - Otherwise, let them select
 - Medium is preferred over a large for first testing

Demonstrate how to put it on:

- Show WHERE the nose clip goes
- Slightly stretch the straps, pinching at connection points on mask so those don’t move
- Remove eyeglasses
- Hold mask against face with nose clip on nose with one hand
- Pull top strap over head to your crown, then bottom strap over head to under occiput;
- Adjust mask on face until comfortable using two hands
- With two pointer fingers, mold nose clip to nose;
- Put eyeglasses back on if they wear them: have them talk and breath normally—if glasses fog up, reseal nose clip
- Demonstrate FIT CHECK and have them do it
- Assess comfort
- *Recommend they wear it for five minutes* (or walk around the building and notice the fit: do they need to adjust it for comfort)
- ONCE they have maximized the comfort, we begin the Fit Test.

Just before starting the testing: Instruct the wearer on the following, before putting the hood back on:

Inform wearer that **at any time during the test they taste the Bitrex (or sweet taste of saccharine mist), they need to let us know. You will keep asking throughout the testing.**

- IF they taste it, the respirator does not fit; select another one and go back to “Demonstrations” step

Point to the Fit-Test Protocol to show the wearer what they are going to be doing, 7 steps for 1 minute each.

- Wearer will be **standing** throughout*

Fit-Test Protocol (for Tester) – USE the **FIT TEST SOLUTION / Test Concentration** nebulizer now

1. Put shroud/hood over respirator wearer
2. Pump the same number of squeezes (10, 20, 30) into the shroud using the **test concentration** bulb. The test can begin – Start your timer (count down from 7 minutes or up from zero)
 - Note: Every 30 seconds of the test, replenish the shroud **with ½ the number** of squeezes needed to achieve the taste threshold response, above **(5, 10, or 15)**
3. Remind the wearer that they need to let you know when they have a bitter (or sweet) taste in their mouth; stop the test
4. Walk through [the seven steps](#) to the end.

Here is the order of the ONE minute tests

1. Normal Breathing: no talking
2. Deep Breathing: slowly and deeply, please no hyperventilating
3. Turn head side to side: slowly, as far as can turn to side and hold; inhale deeply; then other side... repeat
4. Move head up and down: Inhale in position
5. Talking: **out loud slowly and loudly... have them enunciate**
 - Rainbow passage
 - Count backwards from 100
 - Recite song/poem / read a document relevant to your audience
6. Bend over: bend to touch toes (as close as you can get); alternatively, jog in place (can't bend over in hood, so do jog test)
7. Normal breathing: no talking

5. If they get to the end without tasting the challenge chemical: **Keep the hood on**
6. Have them reach into the hood and pull the mask a little bit away from their mouth/nose and breathe through their mouth: Can they taste the chemical now?
 - If they say **yes** (and say gross) then have them drop the mask back to their face and then take the hood off. This FFR is a good fit for them.
 - i. Complete their form with a PASS for this test.
 - ii. Ask them to *keep the mask on* while you do paperwork to protect you and them.
 - If they say **no**, it is a **failed test**. They either cannot taste the chemical OR you did not put aerosol into the hood. You need to test again.
 - i. Do not write a test result; repeat the sensitivity test (using the same shroud)
 - ii. Ask for help

After test: We only need to fit test someone to find ONE mask that fits them. If the first one fits and is comfortable, you are done. If the first one fails, move to the next one. If that fails, do a third. DO NOT do this more than three times with a person, as sensitivity will change. Book another appointment on another day.

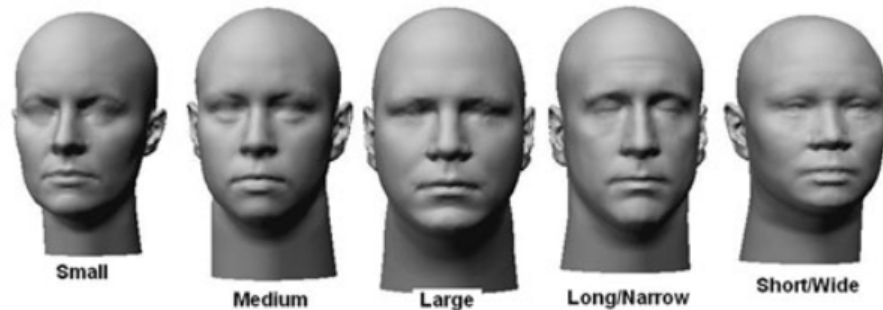
Who Fits What Size?

In 2019, NIOSH incorporated a set of five standard “head forms” that represent five sizes of US heads, to be used across respirator fit studies.

- Small
- Medium
- Large
- Long/Narrow
- Short/Wide

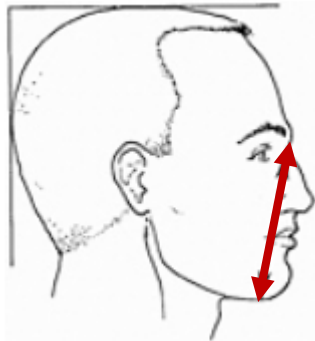
See: *ISO TC94 Personal Protective Equipment, SC15 Respiratory Protective Devices, WG1 General, PG5 Human Factors*. That standard is titled “*ISO 16976-2 Respiratory Protective Devices — Human Factors — Part 2: Anthropometrics*”, accessible through

<https://www.cdc.gov/niosh/npptl/topics/respirators/headforms/default.html>

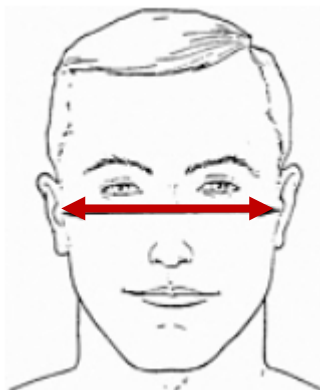


In studying face shapes, two dimensions are important for respirator fit.

Face length (mm), defined as the menton-sellion length (see arrow):



Face width (mm), defined as the byzygomatic breadth (see arrow):



Using these dimensions, NIOSH generated a Bivariate Test Panel, which describes how respirators will be tested for approval (see <https://www.cdc.gov/niosh/npptl/resources/pressrel/letters/conformityinterp/CA-2019-1011.html>)

Figure 1 (below) shows the defined 10-panels, and the subsequent table illustrates what the population distribution is in each cell and specifies how many subjects (of an 18-member panel) will be needed to be tested in each of these panels.

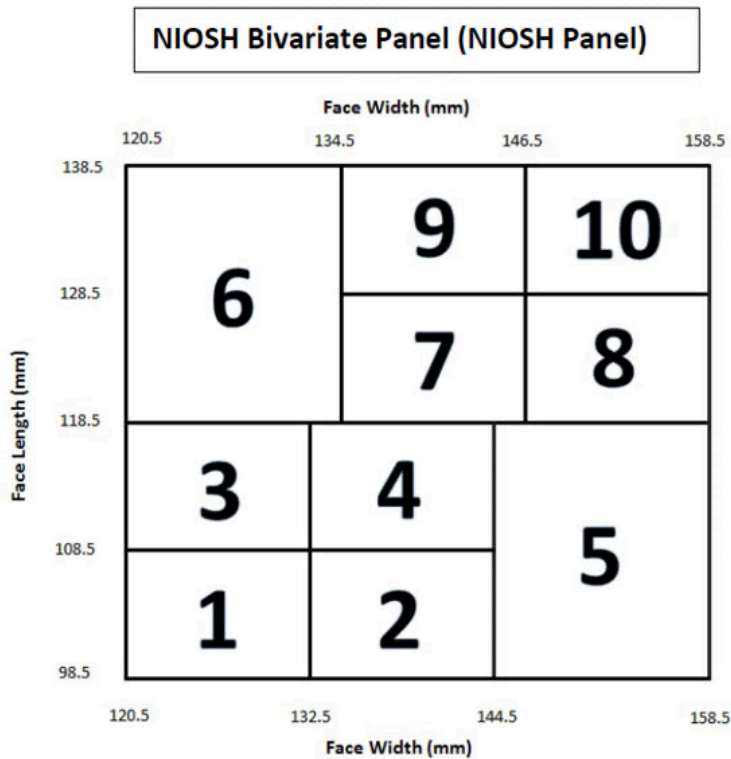
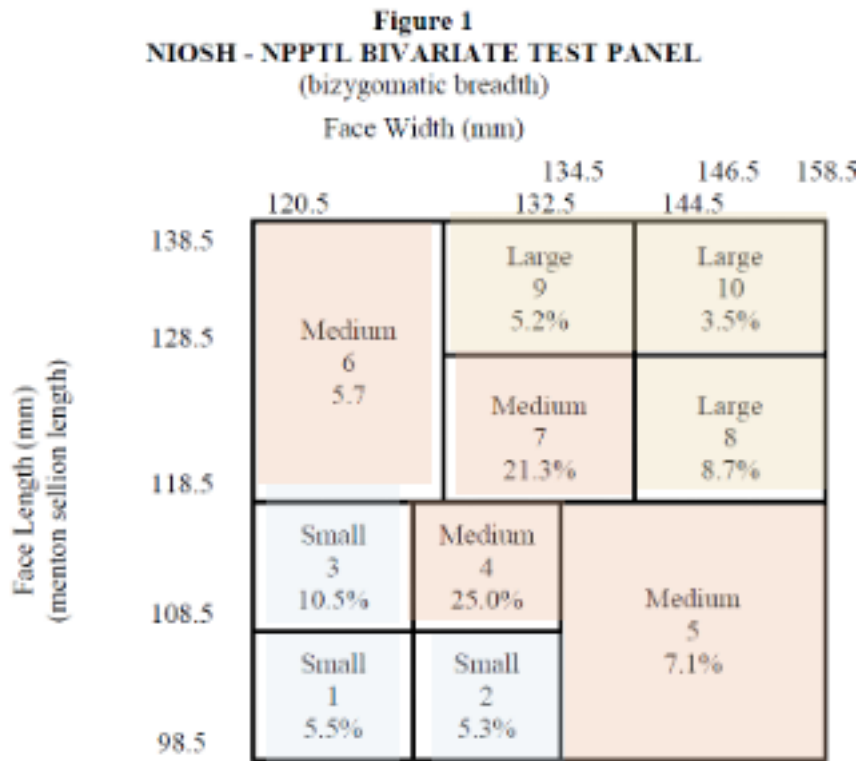


Table 2: NIOSH Panel cell designations; number of tests needed out of an 18-member panel.

NIOSH Panel – cell number	Population distribution (%)	# of test subjects needed	Associated “size” category
1	5.5	1	Small
2	5.3	1	Small
3	10.5	2	Small
4	25.0	4	Medium
5	7.1	1	Medium
6	5.7	1	Medium
7	21.3	4	Medium
8	8.7	2	Large
9	5.2	1	Large
10	3.5	1	Large
Total number of subjects		18	

Following the development of the panel and standard sizes, FFRs were fit tested to determine the match of respirators to “size” categories of those wearing the FFR. Here is the color coded S/M/L categories of face sizes (from above):



And here is information on HOW MANY people passed the fit test when a given “Size” of respirator (columns) was worn by a person with the “NIOSH PANEL SIZE” of face (rows):

Table 1
Passing Fit Test Rate for the NIOSH Bivariate Face Size Panel by Respirator Size

Face Size Panel Category	Respirator Size with Highest Passing Fit Test Rate	Passing Fit Test Rate by Respirator Size and Geometric Mean Fit Factor(GSD) ¹		
		Small	Medium	Large
Small (NIOSH Cells 1–3)	Small	81% Passed 3464.7 ^A GSD	67% Passed 245.5 ^B GSD	26% Passed 18.1 ^C GSD
Medium (NIOSH Cells 4–7)	Medium	67% Passed 390.5 ^B GSD	83% Passed 1562.7 ^A GSD	67% Passed 210.1 ^B GSD
Large (NIOSH Cells 8–10)	Large	28% Passed 30.2 ^B GSD	75% Passed 695.3 ^A GSD	86% Passed 1744.1 ^A GSD

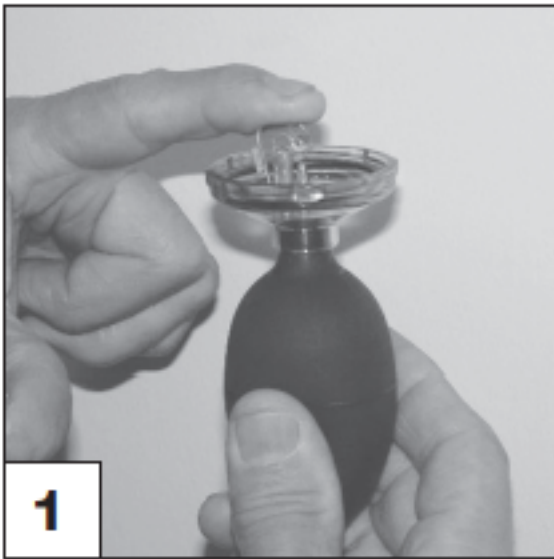
¹ Superscript groupings apply across respirator sizes and within a given NIOSH face size category. Means with the same letter are not significantly different (alpha = 0.05).

IF we look across the rows, a SMALL face category (blue) had 81% passing the fit test when wearing a SMALL respirator, 67% passed when the face was small but a “medium” respirator was worn, and 26% passed when the face was small but a Large respirator was worn. This means that matching the FACE DIMENSION to the RESPIRATOR SIZE is a good start, but it is not sufficient.

Preparing Nebulizers

For Bitrex, you will have two nebulizers to fill. One is for the THRESHOLD test and the other is for the CHALLENGE test. (The SWEET test will require the same process, making two nebulizers, one for threshold and one for actual testing.) (Images from 3M kit instructions)

1. Put gloves on before handling solution. (Only one person per team needs to do this.)
2. Remove the top half of the nebulizer by unscrewing the top from the bottom.
- 3 Using index finger, lightly push down on the atomizer to make sure it is seated all the way down (Image 1)



4. Check that O-ring is seated in each nebulizer
5. For the Sensitivity Test Solution, insert the tip of the SENSITIVITY TEST SOLUTION Bottle onto the base of the nebulizer and squeeze to half-fill the bottom of the bowl. Screw the lid on. Then set it in a holder (so you don't tip the solution out)
6. For the TEST Nebulizer Solution, insert the tip of the FIT TEST SOLUTION bottle onto the base of the nebulizer and squeeze to half-fill the bottom of the bowl. Screw the lid on. Then, set it in a holder so you don't tip the solution out. We will use a lot more of this solution than the sensitivity solution, so you may have to refill.
7. Recommend removing gloves at this point to prevent transferring compound onto other surfaces.

Check station setup to identify:

- Fit test record (to go with person being tested)
- Fit Check procedure (handout to demonstrate donning)
- Fit Test activity list
- Rainbow passage
- Summary Fit test log (for records of those conducting fit test)

Fit Test Record- FFR Testing

Wearer: _____

Tester: _____ Date: _____

Fit Test Protocol Followed: Qualitative, Bitrex

Taste threshold screening: (10, 20, 30 max)

of squeezes to elicit taste response to Bitrex: _____. Check here if no Bitrex response

If no response to Bitrex, perform Saccharine/SWEET test:

of squeezes to elicit taste response to Saccharine: _____. Check here if no Saccharine response

We will use this to perform fit testing with a different solution concentration.

Initial squeezes matches number above; **every 30 seconds** we will repeat with **half** that many squeezes throughout the test)

Respirator #1:

Manufacturer: _____

Model: _____

Size: _____

Pass / Fail

Respirator #2:

Manufacturer: _____

Model: _____

Size: _____

Pass / Fail

Respirator #3:

Manufacturer: _____

Model: _____

Size: _____

Pass / Fail

This should be kept by the person fit tested.

TAKE A PICTURE of the box on the table that matches the FFR that fits you.

This MASK that fits you is yours.

DO NOT TOUCH the outside of the mask without washing your hands immediately: The solution will make your hands taste funny. This will dissipate in time.

GIVE PARTICIPANT INSTRUCTIONS FOR TRAINING BEFORE THEY CAN USE THE RESPIRATOR.

Fit Testing Procedure: Preparation

We *cannot* test anyone:

- With facial hair
- Within 15-minutes of your eating/drinking/chewing gum

1. Can you taste Bitrex?

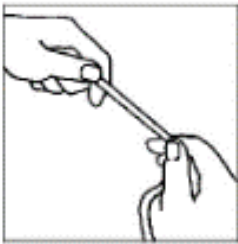
- a. Bitter, non-hazardous material used to test the fit
- b. If yes, complete your form

2. Select Respirator

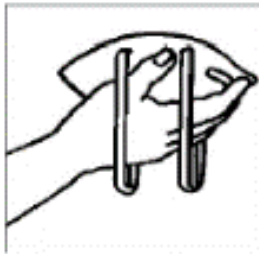
- a. Write down the manufacturer's name and model

3. Put respirator on

- a. See demonstration



Pre-stretch straps



Cup respirator in hand and let straps hang low



Position respirator under chin with nose piece up. First, pull top strap over head, then bottom strap



Mold the nose piece to the shape of your nose, using fingertips from both hands

- b. Seal Check or Fit Check



1. Place both hands over respirator surface
2. Exhale sharply: If you feel leaks, readjust:
 - a. At Nose: Readjust nose piece fit
 - b. At edges: Adjust straps
3. *Repeat*: If still not sealed, this model will not protect you. Select another.

4. Evaluate comfort

- a. Wear for a few minutes to see if it scratches or hurts
- b. Decide if you would wear this respirator; if so, we will start test; if not, pick another one and repeat steps 3 & 4

5. Move to testing procedure (Seven Steps)

Fit Testing Procedure: Conducting Test

Seven Steps for Fit Testing

Each activity takes 1 minute.

Tester will add Bitrex to the hood at the start and halfway through each 1-minute activity.

1. **Normal Breathing:** No talking
2. **Deep Breathing:** slowly and deeply, please no hyperventilating
3. **Turn Head Side to Side:** Slowly
 - a. Turn head to the side as far as comfortable, hold and inhale deeply
 - b. Turn to the other side, inhale deeply
 - c. Repeat
4. **Move Head Up and Down:** Stop when UP and inhale deeply
5. **Talking:** out loud, slowly and loudly
 - a. Rainbow passage
 - b. Count backwards from 100
 - c. Recite song/poem
6. **Jog in Place**
7. **Normal Breathing:** no talking

If at any time during these steps you have a bitter taste in your mouth, this respirator does NOT fit you.
Tell the tester and the test will stop.

The 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 his reach, his friends say he is looking for the pot of gold at the end of the rainbow. Throughout the centuries men have explained the rainbow in various ways. Some have accepted it as a miracle without physical explanation. The Greeks used to imagine that it was a sign from the gods to foretell war or heavy rain. The Norsemen considered the rainbow as a bridge over which the gods passed from earth to their home in the sky. Other men have tried to explain the phenomenon physically. Aristotle thought that the rainbow was caused by reflection of the sun's rays by the rain. Since then, physicists have found that it is not reflection, but refraction by the raindrops, which causes the rainbow. Many complicated ideas about the rainbow have been formed. The difference in the rainbow depends considerably upon the size of the water drops, where the width of the colored band increases as the size of the drops increase. The actual primary rainbow observed is said to be the effect of superposition of a number of bows. If the red of the second bow falls upon the green of the first, the result is to give a bow with abnormally wide yellow band, since red and green lights when mixed form yellow. This is a very common type of bow, one showing mainly red and yellow, with little or no green or blue.

Instructions for FFR Care – For COVID Use

Disposable face filtering respirators are available to purchase more widely now than in 2020, but this may not be the case long term. *In August 2021, EPA has terminated the temporary guidance for agricultural employers and pesticide handlers (cancelling June 2020 and May 2021 guidance).*

With care, you can reuse FFRs in the CPH building (low dust concentration) for many uses. How many uses is a function of its fit, contamination and soiling, and damage.

An FFR should not be reused if:

- FFRs visibly contaminated with blood, respiratory or nasal secretions, or other bodily fluids should be discarded and not reused.
- FFRs that are damaged (e.g., broken straps, broken nose piece), malformed, or are unable to pass a fit check should also be discarded and not be reused.

Information to date indicates that coronaviruses lose viability after 72 hours, a removed FFR should be placed into a paper bag and left for three days.

If it is not soiled and if low likelihood of viral contamination, the CDC has suggested these masks can be reused up to 5 times. (<https://www.sages.org/n-95-re-use-instructions/>)

When putting on an FFR:

- CLEAN YOUR HANDS before touching the FFR
- If it is new, give a slight stretch to the elastic straps, pinching where it connects to the mask so you don't stress this spot
- Cup the mask in your non-dominant hand, the "outside" touching your palm, with the nose clips at your fingertips and the straps hanging off the BACK of your hand
- Place the FFR over your mouth and nose, and hold in place
- With your other hand, take the TOP strap up and over your head to place on your crown, then take the BOTTOM strap up and over your head to place in lower on your head. Adjust for comfort
- Check the nose clip (if new: form with BOTH pointer fingers at the same time)
- PERFORM your fit check (cup hands over worn mask: Breathe out... the mask should slightly pull away from your face; then breathe in... the mask should feel like it snugs against your face)
- Finally, CLEAN YOUR HANDS particularly if you are reusing the mask

When taking off an FFR:

- Before you take it off, have your storage bag ready
- CLEAN YOUR HANDS: You do not want to contaminate the inside of the mask.
- REMOVE the BOTTOM strap first, then the top strap. You should be able to pull the FFR away from your face by the straps, minimizing touching the mask at all where you have breathed
- Examine the FFR: Is it soiled? Damaged? Straps broken? Determine if it is time to throw it away (it goes into a container then into the garbage if someone else empties that garbage can)
- Place the FFR in its storage place – mark it so you know how long to let it sit
- CLEAN YOUR HANDS again

What if I start to feel ill when wearing it?

Leave the room/go outside and remove it. If it becomes difficult to breathe through (because it is wet or has trapped a lot of dust) discard it safely and use a new one.

Questions on OSHA Requirements

Fit Testing Frequency

OSHA (1910.134 and others), FDA, EPA require ANNUAL fit testing, at a minimum.

Annual fit testing recommended from longitudinal study with N95s identified the following trends:

- 10% fail at Yr 1
- 20% fail at Yr 2

OSHA estimated 7% fail at annual retesting, and for those that had lost 20 pounds, 24% no longer had fit.

See: <http://blogs.cdc.gov/niosh-science-blog/2016/01/05/fit-testing/>

The following must be on the fit testing record:

- Employee name or identification
- What type of fit testing was performed
- Specific Make, Model, Style, and Size of respirator tested
- Date of test
- Pass/Fail results for qualitative (if quantitative, include fit factor and stripchart recording)

MAINTAIN this fit test record for the user until the next fit test is administered (Recommend saving as Medical Records)

Training

Workers assigned to work requiring the use of respirators must have ANNUAL (or more frequent) training, before they use a respirator in the workplace. This training must result in employees ability to demonstrate the knowledge of the following:

- *Why* the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;
- What the *limitations* and *capabilities* of the respirator are;
- How *to use* the respirator effectively in emergency situations, including situations in which the respirator malfunctions;
- How to *inspect, put on and remove, use, and check the seals* of the respirator;
- What the procedures are for *maintenance and storage* of the respirator;
- How to recognize medical *signs and symptoms* that may limit or prevent the effective use of respirators; and
- OSHA's *general requirements* in the respiratory standard.

Refresher training is needed annually or *if any* of the following occur:

- Changes in the workplace or the type of respirator render previous training obsolete;
- Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or
- Any other situation arises in which retraining appears necessary to ensure safe respirator use.