



N95 Respirators and Respiratory Protection Q & A

A Hot Topic for Tennessee Municipalities

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N95 Respirators and Respiratory Protection Q & A

With the shortage of N95 respirators, which is the type of respirator recommended by the Centers for Disease Control (CDC) for respiratory protection against the coronavirus, MTAS has received questions about the reuse of N95 respirators and alternate types of respirators and masks. The hot topic provides information on N95 respirators and other types of respiratory protection. MTAS does not recommend or endorse any products. Cities should use this information as a resource when making decisions for their operations.

What is an N95 respirator?

An N95 filtering facepiece respirator (FFR) is a tight-fitting facemask designed to fit tightly around the face that is capable of filtering 95% of airborne particles, such as viruses, from the ambient air. Properly fitted, an N95 respirator forms a tight seal on the face so that all inhaled air passes through the filter media. OSHA regulations require that a person pass a fit test before using an N95 respirator. The N95 respirator has an assigned protection factor (APF) of 10. The concept and precursors for the N95 respirator were developed in 1910, and the first single-use N95 respirator was developed by 3M in 1972. An N95 respirator is designed to be a single-use device.



N95 respirator

What is a surgical mask?

A surgical mask is a loose-fitting mask worn over the nose and mouth designed to provide barrier protection and prevent doctors and nurses from coughing or sneezing droplets into open wounds during surgery. It can also prevent airborne droplets from directly entering the wearer's mouth and nose. A surgical mask is a

barrier mask; it is not a respirator, and it is not designed to filter out airborne particles or pathogens, though it may offer some protection. A surgical mask does not form a tight seal on the face, and a fit test is not required to use a surgical mask. The surgical mask is not a respirator and does not have an assigned protection factor (APF). Surgical masks were first used in 1897. A surgical mask is designed to be a single-use device.



Surgical mask

What is an N95 Health Care Particulate Respirator and Surgical Mask?

This is an N95 respirator that has the same protection levels against airborne particles as the N95 respirator with the additional feature of being fluid-resistant to splash and splatter of blood and other bodily fluids. In other words, it has both the airborne particles filtering capability of an N95 respirator and the barrier capability of a surgical mask. This type of mask is approved by the FDA for use as a surgical mask, where a regular N95 respirator is not.



N95 Health Care Particulate Respirator and Surgical Mask

What is an Assigned Protection Factor?

Assigned Protection Factor (APF) is the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program. An N95 respirator has an APF of 10, meaning that, if used properly, can be safely used in an atmosphere that has a hazardous concentration of up to 10 times the Permissible Exposure Limit (PEL) or other exposure limit for that hazard. The APF can be useful when comparing different types of respirators to see if similar levels of protection are provided.

Can I wear a filtering facepiece respirator if I have facial hair?

No, a person with facial hair that comes between the sealing surface or valve of the respirator and the face cannot wear a respirator. Facial hair that does not come between the sealing surface of the respirator and the face is allowed. This is an OSHA regulation (29 CFR 1910.134(g)(1)(i)).

What is “Fit Testing”?

A fit test is used to verify that a respirator fits a person properly and will provide the intended level of protection. All users of tight-fitting respirators must have a fit test before using the respirator, and annually thereafter. The user must be fit tested with the same make, model, style, and size of respirator that will be used. A fit test is valid only for the specific brand, type, and model being used. This means that if someone is tested on a Brand A N95 respirator, that test is not valid for a Brand B N95 respirator. The CDC has more information on fit testing at this link:

<https://www.cdc.gov/niosh/docs/2018-129/pdfs/2018-129.pdf?id=10.26616/NIOSH PUB2018129>.

Will an N95 respirator work if I'm not fit tested?

Probably. When worn correctly, an N95 respirator will help reduce the number of airborne particles that you breathe. The purpose of the fit test is to be certain that the respirator fits your face properly and will make a good seal. If the respirator does not to your face properly airborne particles will enter through gaps in the seal. If you haven't been fit tested, be sure to read and follow the instructions on how to use the N95 respirator. If a fit test is required and not given, the employer is in violation of 29 CFR 1910.134(f). The U.S. Department of Labor has issued temporary enforcement guidelines for fit testing in healthcare during the COVID-19 pandemic. Those guidelines are available at this link:

<https://www.osha.gov/news/newsreleases/national/03142020>.

What does an N95 respirator do?

The N95 respirator is designed to filter out at least 95 percent of certain non-oil-based particles. An N95 respirator is effective against the coronavirus. The filter media traps particles and prevents them from passing through the mask. Over time, as the mask traps more particles, it becomes more difficult for the wearer to inhale and exhale. The typical "life" of an N95 mask is 8 to 10 hours of constant use, though this will vary with how many particles are in the ambient air.

Are there other types of filtering facepiece respirators?

Yes, there are other types of filtering facepiece respirators, and they are classified in three series: The N, the R, and the P. The N series is not resistant to oil and comes in three versions: the N95 is 95% effective in filtering airborne particles, the N99 is 99% effective, and the N100 is 99.97% effective.

The R series is somewhat resistant to oil and comes in three versions: the R95 is 95% effective in filtering airborne particles, the R99 is 99% effective, and the R100 is 99.97% effective.

The P series is strongly resistant to oil and comes in three versions: the P95 is 95% effective in filtering airborne particles, the P99 is 99% effective, and the P100 is 99.97% effective.

The R and the P series are intended for use where products containing oil (i.e. fuel, hydraulic fluid, paints, pesticides, etc.) are used and the oil component may become airborne.

All three series will provide respiratory protection from the coronavirus.

Are there other standards for filtering facepiece respirators?

Yes. The N, P, and R series are standards promulgated in the United States. Other countries make filtering facepiece respirators that are designed to provide the same level of protection. Respirators certified as meeting these standards from other countries can be expected to function very similarly to one another. These are the equivalent standards from other countries.

- N95 (United States NIOSH-42CFR84)
- FFP2 (Europe EN 149-2001)
- KN95 (China GB2626-2006)
- P2 (Australia/New Zealand AS/NZA 1716:2012)
- Korea 1st class (Korea KMOEL - 2017-64)
- DS (Japan JMHLW-Notification 214, 2018)

Filtering facepiece respirators manufactured in other countries that meet these standards will provide the same level of protection as the N95. In a pandemic situation, using filtering facepiece respirators meeting these standards is an option if N95 respirators are not readily available.

3M Corporation has a technical bulletin dated January 2020, comparing the different specifications. The technical bulletin can be downloaded at this link: <https://multimedia.3m.com/mws/media/17915000/comparison-ffp2-kn95-n95-filtering-facepiece-respirator-classes-tb.pdf>.

What about paint and filter cartridge respirators and the Coronavirus?

Half-mask air purifying respirators designed for painting and other types of work are designed for workplace and occupational applications and not for the health care environment. With that said, many paint and filter cartridge half-mask respirators offer the same level of filtration (95%) as the N95 respirator and have the same APF of 10. OSHA regulations require that a person pass a fit test before using a half-mask respirator. These types of respirators have replaceable filter media and are designed to be reused. The risk is that in their intended use (painting, construction etc.) the wearer does not encounter pathogens, so there is a risk of exposure when one disassembles, cleans, and replaces the filter media in these masks, since their intended use is not to protect against biological hazards. If used off-label to filter pathogens, the filter media or cartridges are medical waste and should be disposed of accordingly.



Half-mask air purifying respirator with filter cartridges

What about full-face respirators?

A full-face air purifying respirator is a facemask designed to fit tightly around the entire face and is capable of filtering 99.9% of airborne particles, such as viruses, from the ambient air. Properly fitted, a full-face respirator forms a tight seal on the face so that all inhaled air passes through the filter media. OSHA regulations require that a person pass a fit test before using a full-face respirator. The full-face respirator has an assigned protection factor (APF) of 50. A full-face respirator has replaceable filter media or cartridges and is designed for multiple uses. After use, the full-face respirator will require cleaning and disinfection. Only certain type of cleaners and disinfectants can be used on full-face respirators, and they may vary by manufacturer. It is a good idea to check with the manufacturer and use cleaners and disinfectants approved for use on that brand of full-face respirator. When used to filter pathogens, the filter media or cartridges are medical waste and should be disposed of accordingly.



Full-face air purifying respirator with filter cartridges

What about powered air-purifying respirators (PAPR)?

A powered air-purifying respirator (PAPR) is a battery powered device that includes a half or full facepiece, a breathing tube, a HEPA (High Efficiency Particulate Air) particulate filter, a battery-powered blower, and a belt. A HEPA filter can capture up to 99.97% of particles as small as 0.3 microns, which includes the coronavirus. A PAPR uses a blower to pass contaminated air through a HEPA filter, which removes the contaminant and supplies purified air to a facepiece or hood. There are two types of PAPRs: half or full facepiece, and a loose-fitting hood.

If the PAPR facepiece is a half-mask or full facepiece, the user must be fit tested. A fit test is not required for a PAPR that uses a loose-fitting hood or helmet that forms a partial seal with the wearer's face, or with a hood that seals loosely around the wearer's neck or shoulders. A PAPR with a full face-piece can have an assigned protection factor of 1,000 if the manufacturer has completed the proper testing and received certification. A PAPR with a loose-fitting hood, and PAPRs without the required testing for a higher APF rating, have an assigned protection factor (APF) of 25.

After use, the PAPR will require cleaning and disinfection. Only certain type of cleaners and disinfectants can be used on a PAPR, and they may vary by manufacturer. It is a good idea to check with the manufacturer and use cleaners and disinfectants approved for use on that brand of PAPR. When used to filter pathogens, the filter cartridges are medical waste and should be disposed of accordingly.



Powered Air Purifying Respirator (PAPR) with loose-fitting hood

What about self-contained breathing apparatus (SCBA)?

Properly fitted, as a full-face respirator, SCBA will provide protection against the coronavirus. OSHA regulations require that a person pass a fit test before using

SCBA. A pressure-demand SCBA has an APF of 10,000. SCBA are complex to use and are not recommended for routine encounters with patients suspected of, or confirmed as, having the coronavirus. After each use, the entire SCBA will require cleaning and disinfection. Only certain type of cleaners and disinfectants can be used on SCBA, and they may vary by manufacturer. It is a good idea to check with the manufacturer and use cleaners and disinfectants approved for use on that brand of SCBA.



Self-Contained Breathing Apparatus (SCBA)

Can I make my own masks?

You can, but it is not a good idea and MTAS recommends that you do not try to make your own mask. The Internet has many examples of people using diapers, underwear, pillowcases, handkerchiefs, ski masks, coffee filters, and other items to make masks. The problem with this is that there is no evidence that these materials will filter out pathogens. Some people may believe that “something is better than nothing,” but using an ineffective homemade mask can lead to a false sense of security and result in exposure to the virus. If you don’t have an appropriate respirator, you should avoid close contact with other people.

Can I reuse respirators designed for a single use?

The short answer is no, they are single use devices. However, the COVID-19 pandemic has depleted supplies, forcing providers to make decisions on extended use and reuse. Many agencies are reusing N95 respirators, and the decision to reuse a respirator is a local policy decision that has risks, and in certain situations reuse is not recommended. The Centers for Disease Control has published a guide, the *Recommended Guidance for Extended Use and Limited Reuse of N95 Filtering Facepiece Respirators in Healthcare Settings* to provide information so each agency

can form their own policy on extended use and reuse. The guide is available at this link: <https://www.cdc.gov/niosh/topics/hcwcontrols/recommendedguidanceextuse.html>.

Can I use an expired respirator?

Yes, with the understanding that there is some risk. The federal government has sent expired N95 respirators from the strategic national stockpile to the states for distribution and use. All respirators have a shelf-life. For N95 respirators that have been stored in a temperature-controlled environment and not subjected to sunlight or physical damage, the filter material is most likely still good. The elastic bands and the nose bridge that hold the mask in place degrade over time, and there is a risk a user will not be able to get a good seal, which could result in leakage.

The CDC Has released *Release of Stockpiled N95 Filtering Facepiece Respirators Beyond the Manufacturer-Designated Shelf Life: Considerations for the COVID-19 Response* with information on this topic. The guidance can be accessed at this link <https://www.cdc.gov/coronavirus/2019-ncov/release-stockpiled-N95.html> and can assist cities in forming their own policy.

My municipality doesn't have a Respiratory Protection Program. Can you help?

Yes, MTAS can help! OSHA general industry standard 29 CFR 1910.134(c) requires that all employers having workers that are required to use respiratory protection have a formal written respiratory protection program. The program must be administered by a suitably trained program administrator. MTAS consultants can assist your municipality in developing a respiratory protection program. To help you get started, a sample respiratory protection program template is available for download from the MTAS Knowledgebase at this link: <http://www.mtas.tennessee.edu/knowledgebase/sample-respiratory-protection-program-template>.



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