



Guidance on the Limited Reuse of N95 Respirators

A Hot Topic for Tennessee Municipalities

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Guidance on the Limited Reuse of N95 Respirators

With the severe shortage of N95 respirators, many municipalities and other organizations are faced with the dilemma of reusing N95 respirators, using a lesser form of protection, such as a surgical mask, trying to make their own mask or respirator, or going without any respiratory protection.

MTAS released a previous Hot Topic covering N95 respirators and respiratory protection, and that publication is available on the MTAS Knowledgebase at this link: <http://www.mtas.tennessee.edu/knowledgebase/n95-respirators-and-respiratory-protection-q-hot-topic-tennessee-municipalities>.

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>.

This hot topic provides information on the cleaning and sterilization of N95 respirators. 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 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. An N95 respirator is designed to be a single-use device.



Example of an N95 respirator

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 limited 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 here: <https://www.cdc.gov/niosh/topics/hcwcontrols/recommendedguidanceextuse.html>.

Decontamination and subsequent reuse of single-use respirators should only be practiced as a crisis capacity strategy. It is important to understand that there are no manufacturer authorized methods for FFR decontamination for reuse.

How can I tell if an N95 respirator can be reused?

First, inspect the respirator for physical damage using the following matrix.

No	Question	Answer	
1	Are there any tears or holes in the respirator?	Yes - DISCARD	No - Proceed to questions 2
2	Has the respirator been folded, bent, creased, or distorted?	Yes - DISCARD	No - Proceed to questions 3
3	Are there any stains on the respirator?	Yes - DISCARD	No - Proceed to questions 4
4	Are the elastic straps securely fastened to the respirator?	Yes - proceed to question 5	No - DISCARD
5	Are the elastic straps still strong enough to hold the respirator to the face for a tight seal?	Yes - proceed to question 6	No - DISCARD
6	During its last use, did anyone directly cough on, sneeze on, or contaminate the respirator?	Yes - DISCARD	No - proceed to question 7
7	During its last use, was the respirator used during an aerosol-generating medical procedure such as a nebulizer treatment, intubation, extubation, bronchoscopy, cardiopulmonary resuscitation, or open suction of an airway?	Yes - DISCARD	No - OK to reuse the respirator

If the respirator has no physical damage, was not directly exposed to body fluids, or was used during an aerosol-generating medical procedure, then it is safe to reuse the respirator.

Can I use alcohol to clean and sterilize an N95 respirator?

Absolutely not. The N95 respirator filter material works by two methods. The first is blocking and trapping particles as the particles wind their way through the filter media. The second is by electrostatic attraction. The filter material contains an electrostatic charge that attracts virus particles and the virus particles get stuck to the filter media. Alcohol removes the electrostatic charge, which reduces the respirator's effectiveness.

Can I use ultraviolet (UV) light to sterilize the N95 respirator?

UV light is not recommended as the intensity and exposure time required for sterilization has not been established. Also, UV light can breakdown the meltblown (MB) PP (polypropylene) nonwoven material used to make the filter media. The degree of decomposition is dependent on the amount of UV light and the length of exposure. Because of the lack of information on the effectiveness of UV light and the degradation of the filter media MTAS does not recommend using UV light for sterilization. Manufacturers recommend keeping the respirators out of sunlight.

Can I use heat to sterilize the N95 respirator?

Yes. Treating the N95 respirator with hot air at a temperature of 70 degrees Celsius (158 degrees Fahrenheit) for 30 minutes will kill the virus. To do this, the respirator must be suspended in the hot air at least six inches away from any metal, as the metal will be higher than the air temperature and could damage the respirator. Use a wooden clip to hang the respirator in the oven or place the respirator on a wooden rack in the oven. This heat treatment can be used several times without a noticeable loss of efficiency. When using this process, follow precautions to prevent exposure to pathogens. Use gloves, avoid touching the inside surface of the respirator, and wash your hands with soap and water for at least 20 seconds.

Can I use steam to sterilize the N95 respirator?

If the inner or out veil of the respirator is not made of paper-like tissues, paper pulp, or a nonwoven material bonded by a water-soluble binder, yes. Steam sterilization at 125 degrees Celsius (257 degrees Fahrenheit) for three minutes will kill the coronavirus and will not damage the N95 respirator. Allow the respirator to air dry for 3 days before the next use.

Can I use boiling water to sterilize the N95 respirator?

Yes, but only if the inner or out veil of the respirator is not made of paper-like tissues, paper pulp, or a nonwoven material bonded by a water-soluble binder. Immersion of the N95 respirator in boiling for three minutes will kill the coronavirus and will not damage the N95 respirator. To prevent physical damage to the respirator, do not stir or agitate the respirator while it is in the boiling water. Allow the respirator to air dry for 3 days before the next use.

Can I use liquid hydrogen peroxide to disinfect the N95 respirator?

Yes. Studies have shown that immersion of an N95 respirator in a 6% solution of hydrogen peroxide for 30 minutes was effective for decontamination and did not cause degradation of the filter media.

Can I wash the N95 respirator with soap and water?

No, as the mechanical action of laundering the respirator will physically damage the respirator.

Can I use bleach to disinfect the N95 respirator?

No. Studies have shown that bleach causes degradation of the filter media and leaves an unpleasant residual odor.

Can I use disinfectant wipes to disinfect the N95 respirator?

Wipes are not recommended as studies have shown that there is ineffective penetration of the disinfectant into the filter media, and some types of disinfectants can damage the filter media.

What are some best practices for reusing an N95 respirator?

- The respirator should only be worn and reused by a single wearer
- Do not fold or crease the N95 respirator
- Before use, check the respirator to make sure that it has no holes, tears, damaged straps, or other defects
- Handle the respirator by the edges and the elastic straps when donning, and be the elastic straps only when doffing
- Assign four N95 respirators for use by one person, and number the respirators 1, 2, 3, and 4. On day 1 use respirator 1 for a day, then sterilize it, and let it dry for 3 days. On day 2 use respirator 2, and then sterilize it and let it dry for three days, etc.

- When not wearing the N95 respirator, store the N95 respirator in a clean paper bag. Each respirator must have its own paper bag. Do not store N95 respirators in a plastic bag
- Discard the respirator immediately if the wearer can no longer get a good face seal
- After extend use/reuse, the respirator filter material will become clogged with particles, making it difficult to breathe. Discard the respirator when it becomes difficult to inhale or exhale.
- Wash your hand thoroughly before donning and after doffing the N95 respirator

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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