

Getting the most from your mask: where to buy and how to wear masks that can block >90% of respiratory particles.

Respiratory viruses (eg coronavirus and influenza), infect people by getting into their nose, mouth and sometimes eyes.

Masks block virus-containing droplets that fly out of people's mouths while talking, singing, coughing or sneezing: <https://www.youtube.com/watch?v=xEp-Sdgl9AU>

High-filtration (Hi-Fi) masks with a snug fit also protect the wearer, by blocking >90% of particles from being breathed in. Woven cloth masks block 5-30% of small particles (data available by request).

COVID-19 is often transmitted while people are talking. Whenever someone is talking, including during meals, everyone should be masked.

Hi-Fi mask suppliers

Examples of brands and suppliers of masks with >90% filtration that I have tested at Lincoln Labs and U. Mass Lowell (data and assay information available by request, jrc@mit.edu) and/or that Aaron Collins has tested (see 3rd tab here <https://tinyurl.com/y6yyz7w3> and video <https://www.youtube.com/watch?v=Gu0GkiOpOj0>).

- BLUNA, Dr. Puri, Blue and BOTN KF94 masks from behealthyusa.net
- LG Airwasher KF94 from <https://www.everydaybeautylab.com/ppe>
- Powecom KN95 masks from bonafidemasks.com/Powecom-kn-95/
- AirQueen Breeze (comes with earloop clip), AirBon (child size) and AirQueen from <https://tinyurl.com/yxwd9pf6>
- Printed masks from <https://masklab.us/>
- Flat masks from <https://www.armbrustusa.com/>

Masks must fit snugly, with no gaps

- Masks commonly come in three shapes: flat, boat-shaped and cone-shaped. Various sizes are also available. A snug fit is easiest to achieve with boat-shaped and cone-shaped mask, according to data from A. Collins and others.
- Bend the nose-clip to fit your face and close the gaps under your eyes.
- Earsavers adjust size to be larger or smaller, so that there are no gaps. They also make it so that the mask can be pulled down without being lost (relevant for young kids). Examples are <https://tinyurl.com/y39m64pv> (small) and <https://tinyurl.com/y5hdxt9r> (large).
- Cord-locks can be used to adjust earloops (eg <https://tinyurl.com/yxoh9zlb>). Some Hi-Fi masks have adjustable earloops already (e.g. Dr. Puri KF94, BOTN, BLUNA, LG Airwasher).
- A mask brace (e.g. <https://www.fixthemask.com/>) makes a tight fit for a flat mask, but should not be used for children or anyone who cannot easily remove their mask.

Hi-Fi masks can be reused but not laundered

- Hi-Fi masks can be reused multiple times and still maintain filtration (40 hours of use or more) as long as they are not damaged or soiled.
- Store used masks in the open air or a paper bag to dry until reuse (7 days or more later is the safest in case of heavy mask-contamination), see <https://tinyurl.com/y682lgz9>.
- Hi-Fi mask filters can be destroyed by soap, alcohol, and agitation with heat so do not launder them. They can be dried with a tissue to remove condensation.

Other tips

- To reduce glasses fogging, wear glasses sitting farther down your nose, away from your face. Alternatively, sprays can be applied to glasses to eliminate fogging (eg <https://tinyurl.com/y3fftf2l>).
- To keep the mask from slipping down while you are talking, try using a different shaped mask (cone-shape, boat-shape) or apply a small piece of surgical foam tape to the inside of the mask, underneath the nose-bridge (e.g. <https://tinyurl.com/y66ovfzw>)

Types of masks and how they work

The CDC wrote a great review (2009) about the development, function and testing of filters for Hi-Fi masks: <https://blogs.cdc.gov/niosh-science-blog/2009/10/14/n95/>

Two types of materials (electret and nanofiber) have been engineered to prevent inhalation and exhalation of infectious respiratory particles. Both types of materials allow air to pass through while actively trapping or blocking virus-containing droplets. Cloth blocks particles mainly by having a tight weave so the more particles it blocks, the harder it is to breathe through.

Hi-Fi masks are designed for respiratory safety so that you are not breathing in particles or chemicals that shed from untested material. Lower quality masks (many blue rectangular masks are in this category) block only 10% of small particles, and some shed particles. Beware of filter inserts that may contain respiratory hazards such as chemicals in vacuum cleaner bags.

Hi-Fi masks are water-resistant, so respiratory droplets cannot seep through. Even when exposed to sweat or water, Hi-Fi masks maintain the ability to block infectious droplets. Cotton cloth absorbs droplets, and is harder to breathe through when wet.

Bacteria and fungi do not easily grow on most Hi-Fi mask materials, but do grow well on cotton.

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