

# QUESTIONS AND ANSWERS

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## What is the purpose of a medical-surgical face mask?

In the OR, surgical masks protect the sterile field from possible contamination, primarily as a result of coughing, sneezing, or talking. A mask also protects the clinicians from the byproducts of surgical procedures such as bone chips, splashes of body fluids, and smoke plume resulting from laser or electrosurgical techniques.

Outside of the OR masks are used for standard precautions to protect clinicians and patients from pathogens that may spread by blood or other body fluids, secretions, or excretions. Surgical masks are effective against droplet transmission.



## What tests or ratings should I rely on to ensure my mask is safe?

Specifications developed by the American Society of Testing and Materials (ASTM) are generally accepted as the industry standard. Beware of mask ratings that do not follow ASTM guidelines.<sup>1</sup>

**BFE (bacterial filtration efficiency)** measures how well the mask filters out bacteria when challenged with an aerosol containing bacteria. ASTM specifies testing with a droplet size of 3.0 microns containing *Staph. aureus* (average size 0.8 microns). Some manufacturers use the Modified Greene & Vesley method to determine the BFE rating. This method is NOT recommended by ASTM for product comparison or evaluating consistency.

**PFE (particulate filtration efficiency)** measures how well a mask filters out particles such as viruses and other sub-micron particles. The higher the percentage, the better the mask efficiency. ASTM requires testing with a particle size from 0.1 to 5.0 microns. *It is important to note the size of the test particles used.* Most manufacturers test at the smallest size of 0.1 microns, but others use a larger particle size (e.g. 0.6 to 1.0  $\mu$ ) thus producing a misleading PFE rating when compared to testing at 0.1 microns.

**Delta P (pressure differential)** measures the air flow resistance of the mask and is an objective measure of breathability. The higher the Delta P value, the harder it is for the wearer to breathe. Masks with a Delta P over 5.0 are considered too “hot” for general medical or surgical use, whereas masks with a Delta P under 2.0 are considered “cool”.

**Fluid resistance** reflects the mask’s ability to minimize the amount of fluid that could transfer from the outer layers through to the inner layer as the result of a splash or spray. ASTM specifies testing with synthetic blood at pressures of 80, 120, or 160 mm Hg to qualify for low, medium, or high fluid resistance.

## Which is more important, BFE or PFE?

The combination of BFE and PFE testing relates to protection against bacteria and viruses. Although each is important, PFE is usually a better indicator of protection level due to the smaller particle size used for testing. A mask with a BFE value of 99% at 3.0 microns may provide less protection than a mask with a PFE of 96% at 0.1 microns. Do not be misled by high BFE/PFE or “filtration” values without knowing the specific test parameters.

## How long is my face mask effective?

The filtration efficiency and protective ability of a face mask is compromised when the mask becomes wet, torn or dislodged. If the mask cannot be easily re-adjusted or becomes wet by overt breathing or fluid insult, it should be replaced.



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### Why is the fit of a mask important?

A mask is only as effective as its fit. There should be no gaps along the side or under the chin that would allow air and droplets to bypass the filter medium. The mask should always be properly adjusted to fully cover both the mouth and nose. A well-fitting mask stays in place over the nose and cheeks and even a regular mask will prevent fogging of eyeglasses if it fits properly.



### How do I ensure a good fit?

There are several things that contribute to a good fit. The most important consideration is the nose piece. It should mold over the nose and cheeks and maintain its shape over time. It should not kink or break when adjusted. Individuals with wider faces should select a mask that ensures full coverage over the face and under the chin. The upper tie should sit at the crown of the head, and the lower tie should be tied behind the neck to hold the sides of the mask against the face to prevent any gaping.

### What else should I know about face masks?

All individuals using face masks must be aware of the protective capabilities of the mask being worn. Health care workers should assess their risk of exposure to blood, body fluids, excretions, and other potential hazards; and choose their mask accordingly.

As part of PPE (personal protective equipment), a face mask is considered to be contaminated once it has been used, and should be discarded immediately. A mask should be removed by the edges or the ties rather than the front panel.

### References:

1. ASTM – American Society of Testing and materials. Standard Specification for Performance of Materials Used in Medical Face Masks F2100-04. Standard test methods: F2299-03, F2101-01, F1862-00a (January, 2006)
2. CDC - Centers for Disease Control. Guideline for the Selection and Use of Personal Protective Equipment (PPE) in Healthcare Settings. (June 2004)
3. OSHA - United States Occupational Safety and Health Administration. 1910.1030 Blood borne Pathogens Standard (2002)
4. WHO - World Health Organization. Practical Guidelines for Infection Control in Health Care Facilities, (January 2005)

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