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What do the ASTM Levels mean?

ASTM International is an FDA-recognized organization that defines and sets standards for products, materials, and systems used in the workplace. In the context of face masks, ASTM levels describe how well a mask performs when tested on bacterial and small particulate filtration ability, fluid resistance, and of course, flammability (a mask on fire is no help at all).

You may be wondering what they're actually doing to these masks to test them. Basically the labs simulate contact with contaminants and then measuring what gets through. Among other things, they spray aerosolized bacteria at the mask and take a bacteria count, they spew synthetic blood at the mask to see how much gets through, and they try to set them on fire (pro tip: if it catches fire, it's not an ASTM standard mask).

The levels range from 1 to 3 in order of barrier efficacy. The below chart outlines the exact specific abilities of each mask:

If this chart is all Greek to you, that's probably because it is. The μ symbol is the Greek letter Mu, used in scientific contexts to mean micro. One micron or micrometer is equal to one thousandth of a millimeter. To understand how small that is, a human hair ranges from 17 to 181 microns in diameter. Most bacteria are larger than 0.3 microns, and viruses are even smaller (but are suspended in water droplets which are larger). The chart shows the ability of different masks to protect against particles that are roughly 3 microns and 0.1 microns.

Surgical masks meeting ASTM Level 2 or Level 3 are able to filter 98% or more of bacteria and 0.1 μ m particulates, while ASTM Level 1 can only filter $\geq 95\%$ bacteria. ASTM Level 3 performs the best in terms of filtration and fluid resistance, but Level 1 has the best breathability. Which level is right for you depends on your specific needs and circumstances.

What does ASTM Level I mean?

Level 1 masks are generally considered to be a low-grade barrier ideal for procedures and environments with near-zero risk of fluid exposure where splashing or spraying of fluids are not expected. A Level 1 mask is a solid and cost-effective option for everyday non-medical use, as well as medical use for routine care and environments with no risk of fluid transmission.

What does ASTM Level II mean?



Rewards are considered to be a moderate barrier suitable for procedures in which a light or moderate amount of fluid, aerosols or spray are produced. This mask is ideal for procedures and environments with moderate



risk of fluid exposure where splashing or spraying can happen.

What does ASTM Level III mean?

Level 3 masks designed for fluid protection. They are considered a high-grade barrier ideal for procedures and environments with high risk of fluid exposure where splashing or spraying will happen with a moderate or high amount of fluid, blood, aerosols or spray exposure. For those who aren't medical professionals, you may also consider upgrading to a Level 3 mask if you are frequently exposed to large crowds or other people not wearing masks.

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