

Do users benefit from HEPA air filters on hand dryers?

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Hygiene is critical in public washrooms, which is why hand dryers are often fitted with air filters. But is there any real advantage to the filter being a super-high performance HEPA unit?

Some of the most significant advances in technology over the last 100+ years have been in the fields of public sanitation and hygiene. As with many developments however, it is always possible to take it too far. One such candidate might be the use of HEPA air filters on hand dryers.

Air filters come in many forms and include super-high-performance units designed for demanding applications in medicine, bacterial research laboratories and nuclear installations. HEPA (High Efficiency Particulate Air) filters, for example, were originally developed by the military as protection against radioactive contamination in the Manhattan Project. As such their design is covered by American Military Standard, MIL-STD-282 [1], as well as by the Institute of Environmental Sciences and Technology's IEST-RP-CC001 [2]. It should be noted that there can be some variation in the requirements of equivalent standards in different countries, but as a guide all HEPA filters must collect more than 99.95% of contaminants of 0.3 microns diameter.

As with nearly all technologies there is a natural trend toward adoption driven by commercial pressures and public awareness, which has seen HEPA filters used in ever more applications. They have been applied in many worthy civilian instances,

such as industrial clean rooms, biological laboratories and the air recirculation systems of commercial airliners, where they do invaluable work.

Moving away from installations in enclosed environments, today HEPA filters can commonly be found in hand dryers – but is this sensible? They are right for airliners where the cabin air is recirculated many times during a long-haul flight and no one would argue that they are not essential for laboratories where microbes or particulates cannot be allowed escape, but how about public washrooms?

While public washrooms should be clean, they are far from sterile. They are not airtight and many people use them – statistically some of whom will be carrying infections. Users all touch the door handles and other surfaces, and everybody breathes the same air. Where HEPA filters in airplanes clean the air throughout the entire plane cabin, in hand dryers they will not contribute to the creation of a hygienic washroom environment. The filters will only ultraclean the small amount of air blown out by the device. This will however come into contact with the remaining, unsterile air in the washroom before reaching your hands. Thus, we can conclude that a HEPA filter on a hand dryer will not protect you from the risk of infection by breathing the ambient air, drying your hands or pulling on the door handle.

In the real world, there are other practicalities to consider, a lab will observe very strict servicing and maintenance procedures set down by the suppliers and operators of the equipment and the facility itself. It is worth noting that a HEPA filter requires frequent and expensive servicing or replacement to keep it effective, and that may be lacking in some (personal experience will give you an indication of how many) washrooms.

This is an example of taking the time to understand the application. A public washroom should be a clean environment, but it is not highly controlled – the

ambient atmosphere and the main touchable surfaces may contain bacteria. And an air filter on a hand dryer will do little to counteract this. A damp, serviced HEPA filter can also reduce air flow and in extreme cases add contamination to the air it filters.

There are more reliable and economical alternatives that are designed specifically for use in washroom dryers. A more robust silver ion filter for example offers antimicrobial properties, eliminating the risk of bacterial build-up in the filter itself with little to no servicing required. It may therefore prove to be more effective in the long run. Worth remembering if you are involved in specifying automatic hand dryers.

[1] <https://www.dsp.dla.mil/Specs-Standards/>

[2] <https://www.iest.org/>

Image captions:



Image 1: Where HEPA filters in airplanes clean the air throughout the entire plane cabin, in hand dryers they will not contribute to the creation of a hygienic washroom environment. [Source: Mitsubishi Electric Europe B.V.]

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About Mitsubishi Electric Wave

Developing products driven by a philosophy of constant innovation and technical ingenuity, Mitsubishi Electric has been helping to improve people's lives since its founding in 1921. Our pioneering technologies make waves across industry – including in hygienic and washroom applications, where our hand dryers set the gold standard.

Wave Technology represents our most advanced, efficient and hygienic solution for hand drying to date. In comparison with paper towels, the use of which typically generates 17.1 kg CO₂ per dry as well as unrecyclable waste, our hand dryers can cut emissions by 99.7%, with only 0.058 kg CO₂ per dry while maintaining optimum hygiene performance and limiting noise levels.

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