

The Filtration Efficiency of Bacteria compared to Standard Test Particles

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The objectives of this study were to investigate if it is useful to perform relatively expensive and complicated tests with bio-aerosols for specific purposes, and, more generally, how strongly the physical properties of the test aerosol affect the filter efficiency. The influence of size, shape, and charge neutralization of the test aerosol on the penetration through four filters from various manufacturers was investigated at flow rates of 30, 50, and 80 l/min. Test aerosols consisted of spherical and elongated particles, including three types of non-pathogenic bacteria. Efficiency increased considerably with particle size from 0.5 -2 μm . Particle charge significantly affected the penetration of the bacteria and elongated particles, but not of the spherical latex particles. Particle shape has an influence in extreme situations, but the effect was obscured by the much stronger effect of loading on filter efficiency.

The results show no reason to perform tests with specific biologicals, since they were filtered out at least as efficiently as other particles of similar aerodynamic size. This result is expected on theoretical grounds. An exception must be made for filters containing active biocidal components and filters with extremely high efficiency.