Testing Methods Designed to Comply with Respiratory Protection Filter Standards

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Abstract

The certification and quality control of respirator filters, filtering face pieces etc. as personal protection equipment is regulated and standardized world wide. In the USA, 42 CFR part 84 describes how to test and classify such filters. In Europe, the CEN standard EN 143 describes how to test filters for respiratory protection. While both the American regulation and the European test standard use sodium chloride and oil droplets as test aerosol, both standards are substantially different and test results obtained according to one or the other method are not directly comparable.

Besides the differences in the aerosol and the detector, there are also differences in the test procedures: Certification in Europe is based on initial particle penetration tests (both paraffin oil and NaCl) followed by loading the filter with dolomite dust and by final particle penetration tests. Certification in the USA is done by means of continuous measurement of the particle penetration during a loading test. Depending on the type of filter, DOP oil droplet aerosol or solid NaCl aerosol are used for filter loading and penetration measurement. An additional loading test with paraffin oil is under discussion in Europe as well.

During a measurement campaign run in November 2007 at BGIA (accredited respirator filter certification laboratory and notified body, Sankt Augustin, Germany), comparison measurements between BGIA's EN 143 compliant test rigs and test equipment used by the American NIOSH for 42-CFR-82-compliant certification tests (TSI 8130) were run. Goal of these comparison tests was to analyze if the TSI 8130 tester can be modified to give results which are equivalent to the results obtained using BGIA's EN 143 compliant test equipment. The results of these tests are discussed in this paper.