

Workplace Performance of Electret Filters With and Without Exposure to Paraffin Oil

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Recent laboratory measurements have renewed interest in the potential degrading effects of oily aerosols on electret filter media. In this study, a group of six European CEN approved P1 filters were loaded with 60 mg paraffin oil in accordance with a proposed testing revision prior to penetration and pressure drop testing according to EN 143 requirements. A second group of P1 filters was not loaded with paraffin oil prior to the EN testing. To permit comparison of filters approved using different test criteria, a group of six NIOSH approved N95 filters was tested for penetration and pressure drop using NIOSH test procedures. All filters were subsequently exposed to the aerosols generated in a lead refining operation. Mass penetration of lead for each exposed filter was determined. In addition, the appropriate EN or NIOSH penetration and pressure drop tests were repeated on the filters after the workplace exposure. The measured laboratory aerosol penetration for both groups of P1 filters increased significantly from the pre-workplace value. The change in laboratory penetration for the N95 filters was not statistically significant. All three groups of filters performed very well against the workplace aerosol. The maximum lead penetration was 0.31% for a P1 filter pre-loaded with paraffin oil. These results demonstrate that laboratory filter penetration tests do not correlate with filter penetration of workplace aerosols. In addition, it can be seen that more severe laboratory tests do not assure better workplace performance than existing tests.