

**Comparative Study of Respirator Fit-Testing Instruments
Using Ambient Aerosols**

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ABSTRACT

As a fit-testing instrument using ambient aerosols, PortaCount (TSI Inc.) is well-known and based on condensation nuclei counter (CNC). On the other hand, a fit-test instrument based on optical particle counter (Sibata Mask fitting tester MT-03) is widely used in Japan. In this study, we compared the performance of these instruments using human subjects wearing particulate respirators. Five male human subjects joined voluntarily in this project and 19 types of RL2 class (equivalent to R95 mask of NIOSH standard) replaceable half mask particulate respirators were used. Five exercises of the fit-testing were based on OSHA 1910.134 but talking was conducted in accordance with Japanese Industrial Standard.

Fit factor measured by the instruments showed good agreement for artificial leakages of HEPA filters with hypodermic needles. Averaged fit factor of each human subject for each particulate respirator was also compared with both instruments. The fit factor measured by PortaCount without N95 Companion showed around three times higher than those by MT-03. It was caused by the difference of filter collection efficiency of respirators measured by both instruments. Furthermore, moisture in the exhaled air may affect positively on MT-03 counting and negatively on PortaCount counting.