

## **CORRELATING AND EXTRAPOLATING AIR-PURIFYING RESPIRATOR CARTRIDGE BREAKTHROUGH TIMES—A CRITICAL REVIEW**

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In moving forward in respiratory protection we will rely much on the past. Over the past 50 years, various models have been proposed and used for correlating and extrapolating measured breakthrough times for air-purifying respirator (APR) cartridges and canisters. These models range from simple equations to Rules-of-Thumb to elaborate computer programs. In some cases correlations based on limited data were later invalidated with subsequent data, but are still used. Sometimes models based on data for physical adsorption of vapors are used indiscriminately for cases where vapor removal is likely to be by a reactive mechanism (e.g., reactions with adsorbed water or sorbent impregnants). To assist in its internal assessments of cartridge testing data submitted for new chemical cases, the U.S. Environmental Protection Agency identified the need for developing guidance which would interpret cartridge testing data and evaluate the use of such models. In response, a critical review has been done to 1) gather these models together in one document, 2) define their requirements and limitations, and 3) demonstrate their usability for extrapolating APR cartridge breakthrough time measurements to untested conditions (concentrations, humidities, temperatures, breathing rates, and covapors).

We request the opportunity for an oral presentation.