ORGANIC VAPOUR CARTRIDGE BREAKTHROUGH CURVES UPON REUSE AFTER STORAGE

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The service life of organic vapor cartridges used with air purifying respirators is dependent upon a number of factors. In this study, breakthrough curves have been measured with six organic vapors both with and without periods of storage (nonuse) before measuring the breakthroughs. This work was carried out at the National Institute for Occupational Safety and Health and the Los Alamos National Laboratory. Periods of storage varied up to 28 days. Concentrations periods of initial use and humidity were also varied. Breakthrough curves were characterized by midpoint times (from which capacities were determined) midpoint slopes (from which rate coefficients were determined) skews and any immediate breakthroughs upon reuse (IBUR). The major conclusions are that total capacities and adsorption rates are unchanged after storage (no trends with time) within uncertainties of +10% and +25% respectively. The significance of this is that experimental breakthrough curve data and service life estimation models such as BREAKTHROUGH and MULTIVAPOR can be used (with modifications for IBUR) to estimate the service life of organic vapor cartridges. The IBUR result from migrations of vapors from the adsorption wave fronts within a cartridge to its exit during nonuse storage. Migrations and IBUR which increase with initial use time of storage and volatilities of the vapors require additional data to be fully quantified for predictive purposes.