

The Risk of Desorption from Activated Carbon Filters

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There is a tendency to equip filtering respiratory protective devices with a blower system to lower the breathing resistance. Because there is a continuous flow of air through the filter, the possibility that adsorbed contaminants are released from the filter is enlarged, which evidently is undesirable. The purpose of this work was to explore whether there is a significant risk that physisorbed or chemisorbed contaminants desorb from the filter. Breakthrough experiments were performed under various conditions with cyclohexane and ammonia, a so-called Toxic Industrial Chemical. During a certain time an activated carbon filter bed was exposed to either cyclohexane or ammonia, followed by a period of clean air flow. The experiments showed that respiratory protective devices with a continuous airflow do have a risk to release previously adsorbed contaminants at too high concentrations. Under humid conditions the release of physisorbed contaminants occurs even more rapidly than under dry conditions. Finally, the results give rise to the disturbing conclusion that extended use or re-use of conventional, i.e. non-power assisted, respiratory protective devices can also pose a desorption risk.