

Metal Oxide Sensors as End-of-Service-Life Indicator (ESLI) -Potential, Implementation and Limitations

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The safe use of filter cartridges in industrial hygiene demands a detailed knowledge of the occupational working conditions. But still, due to variations of the determining factors predicting the filter service life will in some cases be associated with a not acceptable uncertainty. This is especially true for gases with poor warning properties. Therefore legal regulations in some countries call for an end-of-service-life indicator to inform the user about the upcoming filter breakthrough, preferably by means of active signals. Up to now only a limited range of ESLI systems can be found on the market, most of them relying on passive colour indicators.

This paper will present the status of ESLI systems for occupational respiratory protection. An overview of ESLI concepts and requirements will be given and the obstacles for developing and marketing such systems will be discussed.

Approaches to utilise metal oxide semiconductors (MOS) in ESLI systems and own experimental results on the response and aging behaviour of commercially available MOS sensor systems to organic compounds will be introduced. Experimental results as well as software calculations on the filter breakthrough behaviour will be discussed in terms of the required pre-warning time. The potential as well as the limitations of MOS as ESLI sensor for organic vapour filters and alternative design concepts will be presented.