



## **UKLA Metalworking Fluid Product Stewardship Group**

### **TOPIC REVIEW 2 : Metalworking Fluids and Occupational Respiratory Disease Risks for Machinists**

**Introduction:** This document reviews the health implications of using metalworking fluids (MWFs) in machining, particularly respiratory diseases such as chronic bronchitis, asthma, and Chronic Obstructive Pulmonary Disease (COPD). The primary purpose of this review is to examine associations between exposure to 'used' MWF mist and respiratory health problems among machinists. Specifically, it considers the risks posed by chemical and biological contaminants that accumulate in used MWFs and the impact of good-quality MWF management practices on machinists' health.

**Research Methods:** The review draws on peer-reviewed studies published in international medical and scientific journals between 2000 and 2023. A range of research methodologies was employed, including occupational and environmental exposure monitoring studies and laboratory-based evaluations of low-cost and research-grade air-quality monitoring sensors. The review highlights limitations, including calibration and quantification issues, and the reliability of low-cost sensors.

**Main Findings:** Machinists exposed to 'used MWFs' have a higher prevalence of respiratory conditions when exposed to concentrations of mist below the now withdrawn UK Workplace Exposure Limits (WEL) for water-mix MWF and neat oils. Exposure to contaminated water-mix MWF mist may trigger respiratory diseases due to contaminants such as bacteria, endotoxin, and other chemical irritants. Data from occupational disease outbreak studies found a link between exposure and increased risk of Occupational Asthma (OA) and Occupational Hypersensitivity Pneumonitis (OHP).

**Discussion and Analysis:** This review emphasises the critical health risks associated with exposure to MWF mist, reinforcing the need for stringent mist control practices within machining environments. The presence of harmful organisms in MWF suggests that these fluids not only have the potential to cause chronic disease but that their management practices directly influence machinists' health outcomes. The review also concludes that improved quality management of MWFs can lead to better health outcomes for machinists, and workplaces therefore have a responsibility to improve lubricant management practices continuously.

**Conclusion and Knowledge Gaps:** The study concludes that there is a significant need for further research to address knowledge gaps on the prevalence of respiratory diseases among machinists and to evaluate the effects of improved MWF management on their health. Future studies should focus on establishing practical mist-monitoring strategies, understanding the



dynamics of biofilm formation in MWF systems, and assessing whether long-term improvements in machinists' health are sustained by maintaining MWF quality.