

UKLA Metalworking Fluid Product Stewardship Group

TOPIC REVIEW 3: Metalworking Fluids and Occupational Skin Disease Risks

Introduction: Skin diseases, particularly dermatitis, pose significant health risks in occupational settings, especially in machinists exposed to Metalworking Fluids (MWFs). This review summarises published evidence on the prevalence, causes, and preventive measures for skin diseases among machinists. The main research questions focus on irritant and allergic reactions associated with exposure to MWFs, the effectiveness of current diagnostic and preventive strategies, and the broader implications for machinists' health.

Research Methods: The review considered peer-reviewed studies published in international medical and scientific journals between 1980 and 2023. Data were gathered through patch testing for specific allergens, case studies of dermatitis prevalence, and health surveys of metalworkers across Europe. The research also integrated information from government and health organisations on existing regulations, compliance with these regulations, and control measures to mitigate these health risks.

Main Findings: The findings indicate that irritant and allergic contact dermatitis accounted for 90-95% of occupational skin diseases in machinists. Their prevalence of dermatitis is significantly higher (20-30%) than in the general adult population (4%). Key dermal allergens include formaldehyde, colophony, and metals such as nickel and chromium. Moreover, studies show a strong correlation between skin exposure to MWFs and the development of irritant dermatitis. This often results from frequent contact exposure to water-mix MWF and the complex mixtures of chemicals, oils and surfactants. Minimising exposure to metalworking fluids and enhancing skin protection practices can yield substantial occupational health and economic benefits for machinists.

Discussion and Analysis: Evidence indicates that irritant dermatitis often arises from regular immersion in contaminated water-mix MWFs, whereas allergic dermatitis is linked to exposure to specific chemical allergens in these fluids. Continuous education, training, and improved workplace practices are crucial for mitigating these health risks. Furthermore, recommendations for preventive measures, such as health surveillance and adherence to safety guidelines, were summarised.

Conclusion and Knowledge Gaps: The main conclusions highlighted two key points: first, machinists are more likely to develop irritant dermatitis, with 'wet-work' a significant risk factor. Second, although allergic dermatitis is less common in machinists, it can cause severe symptoms and affect their long-term quality of life. Educational interventions and awareness-raising about dermatitis risks can help mitigate the onset and progression of dermatitis in machinists. Knowledge gaps include a lack of robust evidence on the reasons for the decline in dermatitis cases in machinists over the last decade, and understanding the effectiveness of educational programmes aimed at reducing exposure risks for machinists.