

A Study of the Resistance of Protective Glove Materials to Metalworking Fluids

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Abstract : Hand injuries due to mechanical hazards such as cuts and punctures are major risks and concerns for several occupational groups, particularly for workers in the metal manufacturing sector and mechanical automotive services. Personal protective equipment such as gloves or clothing is necessary for many professionals to protect against a variety of occupational hazards, which arise daily in their work environments. In many working places such as metal manufacturing or automotive services, mechanical hazards often occur together with industrial contaminants, particularly metalworking fluids (MWFs). The presence of these contaminants could modify the properties of gloves made from polymeric materials and thus increase the risk of hand injuries for workers. The focus of this study is to determine the swelling characteristics and the resistance of six polymer membranes when they are contaminated with several industrial metalworking fluids. These polymer membranes, commonly used in protective gloves, are nitrile, neoprene, vinyl, butyl, polyurethane and latex rubbers. Changes swelling index were continuously followed during the contamination procedure to compare the performance of each polymer under different conditions. The modification of the samples surface, tensile properties during the contamination process was also investigated. The effect of temperature on mechanical properties and morphology of material was also examined.

Keywords : metalworking fluid, swelling behavior, protective glove materials, elastomers

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