

# **Dermal Protection during High Dexterity Applications with Low Molecular Weight Methacrylate Formulations**

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The available literature for chemical resistance of disposable gloves commonly used in high dexterity operations involving potential exposure to lower molecular weight methacrylates was identified. The relevant articles were obtained. The database assembled included published journal articles and technical data from manufacturers available on the internet or provided in response to direct inquiries. Abstracts were reviewed. Those articles that appeared to have relevant breakthrough time data for the lower molecular weight methacrylate esters were obtained. This review does not focus on industrial gloves.

Most thin, disposable gloves commonly used for high dexterity procedures are made of latex, nitrile, polyethylene or vinyl and have reported breakthrough times (BTT) of less than a minute to several minutes for concentrated MMA. No detailed information is available for the other MPA-relevant ester materials. Although neoprene gloves are also used for applications requiring high dexterity such as medical applications, no information on the BTT of MMA was identified for this glove type. Some glove materials have reported longer BTTs, e.g., disposable laminate gloves are reported to provide BTT greater than 20 minutes, with more recent data indicating times > 120 and 480 minutes. The laminate gloves identified are not form fitting, indicating that they may not be suitable for high dexterity applications.

Glove selection for particular high-dexterity uses appears to be determined by a combination of glove material/thickness with conditions of uses, i.e., concentration, duration and frequency of exposure. In this way a glove type may be preferred for a specific use(s) but possibly not for another. For example, a letter written by Cardinal Health dated Sept 21, 2018 claimed that MMA breakthrough did not occur under standard (recommended) operating conditions for compounded bone cement, i.e., with a contact time ranging from 3 (latex) to 16 (polyisoprene) minutes. This indicates that safe handling using a variety of gloves is possible for some high-dexterity operations involving materials containing MMA, such as bone cements, if safe handling advice provided by the manufacturer is followed, in conjunction with any applicable regulations. However, the same glove type would not necessarily be used for all MMA containing products and for all short duration tasks. It remains the responsibility of the manufacturer to determine safe handling conditions and guidance for their product for any intended and foreseeable use(s).

*Disclaimer: This review focused on reported resistance and breakthrough times of various types of “thinner” gloves used in high-dexterity applications. It is not intended to endorse the claims made by Cardinal Health or other data sources cited, or to provide recommendations on the usage of specific gloves in any context. Furthermore, this review did not specifically focus on the existence of regulatory requirements; professional training; other guidelines and advice provided by manufacturers on the selection, conditions of use, and replacement of gloves for specific tasks; or end-user compliance with applicable regulations, guidelines and advice.*