

## **Evaluation of tremolite asbestos exposures associated with the use of commercial products.**

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### **Abstract**

Tremolite is a noncommercial form of amphibole mineral that is present in some chrysotile, talc, and vermiculite deposits. Inhalation of asbestiform tremolite is suspected to have caused or contributed to an increased incidence of mesothelioma in certain mining settings; however, very little is known about the magnitude of tremolite exposure that occurred at these locations, and even less is known regarding tremolite exposures that might have occurred during consumer use of chrysotile, talc, and vermiculite containing products. The purpose of this analysis is to evaluate the exposure-response relationship for tremolite asbestos and mesothelioma in high exposure settings (mining) and to develop estimates of tremolite asbestos exposure for various product use scenarios. Our interpretation of the tremolite asbestos exposure metrics reported for the Thetford chrysotile mines and the Libby vermiculite deposits suggests a lowest-observed-adverse-effect level (LOAEL) for mesothelioma of 35–73 f/cc-year. Using measured and estimated airborne tremolite asbestos concentrations for simulated and actual product use, we conservatively estimated the following cumulative tremolite asbestos exposures: career auto mechanic: 0.028 f/cc-year; non-occupational use of joint compound: 0.0006 f/cc-year; non-occupational use of vermiculite-containing gardening products: 0.034 f/cc-year; home-owner removal of Zonolite insulation: 0.0002 f/cc-year. While the estimated consumer tremolite exposures are far below the tremolite LOAELs derived herein, this analysis examines only a few of the hundreds of chrysotile- and talc-containing products.

**Keywords:** Asbestos, amphibole, tremolite, chrysotile, talc, joint compound, vermiculite, risk assessment, cleavage fragments, mesothelioma, effect level, exposure assessment, thetford chrysotile mines