

Abstract Submitted  
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**Wipe Coating from a Partially Saturated Porous Material** GERARDO CALLEGARI, ILYA TYOMKIN, TRI Princeton, KEN ZWICK, Kimberley Clark, ANDREW BAKER, PETER KAPLAN, TRI Princeton, ALEXANDER NEIMARK, Rutgers University — In the last few years, there has been a dramatic increase in the number of consumer products where a porous media is used to deliver a fluid with a desired functionality. A partially saturated porous material wiped against a hard surface leaves a coating of fluid behind and may be seen as a coating process. Nobody addressed this problem before in the open literature and there is no model describing its dynamics. From this point of view, it is a new process and we will call it “wipe coating.” We present a model which gives the film thickness dependence on velocity, viscosity, surface tension and transport properties of the non-deformable porous material, when it wipes on a hard smooth surface, it is partially saturated with a Newtonian liquid and the variation in saturation is negligible. The model is validated through experimental measurements run at different saturations, velocities and permeabilities. The agreement is very good, with the adjustment of only one free parameter which includes the partial permeability of the medium. Complimentary experiments confirmed the value obtained for the fitting parameter.

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