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Hydrodynamic Penetration of Viscous Fluids THOMAS WARD, UCLA, HOWARD STONE, Harvard University — Using boundary layer theory we develop a model for liquid penetration driven by a source above a fluid interface and locally (along the interface) the velocity field is pure extensional flow characterized by a stagnation point. The two fluid boundary layer analysis yields data for the interfacial stress as a function of the absolute and kinematic viscosities. For systems with finite surface tension we solve the normal stress condition in the limit of small deformations and we present data for the interface shape as a functions of the Weber and Reynolds numbers.

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