

Abstract Submitted
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On the development of turbulent boundary layer with wall transpiration¹ MARCO FERRO, ROBERT S. DOWNS III, BENGT E. G. FALLENIOUS, JENS H. M. FRANSSON, Linné Flow Centre, KTH Royal Institute of Technology — An experimental study of the development of the transpired boundary layer in zero pressure gradient is carried out on a 6.4 m long hydrodynamically smooth and perforated plate. The relatively longer development length of the present perforated plate compared to the ones used in previous studies allows us to investigate whether an asymptotic suction boundary layer with constant thickness is achieved for the turbulent state, analogously to what happens in the laminar state. Velocity profiles are obtained via hot-wire anemometry while the wall shear stress is measured at several streamwise locations with hot-film and wall-wire probes as well as with oil-film interferometry. The threshold suction coefficient above which relaminarization starts to occur is examined. The scaling of the mean velocity and of higher order velocity moments is discussed in light of the measured wall shear stress data.

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