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Construction of a Non-Equilibrium Thermal Boundary Layer Facility DRUMMOND BILES, ALIREZA EBADI, ALLEN MA, CHRISTOPHER WHITE, Univ of New Hampshire — A thermally conductive, electrically heated wall-plate forming the bottom wall of a wind tunnel has been constructed and validation tests have been performed. The wall-plate is a sectioned wall design, where each section is independently heated and controlled. Each section consists of an aluminum 6061 plate, an array of resistive heaters affixed to the bottom of the aluminum plate, and a calcium silicate holder used for thermal isolation. Embedded thermocouples in the aluminum plates are used to monitor the wall temperature and for feedback control of wall heating. The wall-plate is used to investigate thermal transport in both equilibrium and non-equilibrium boundary layers. The non-equilibrium boundary layer flow investigated is oscillatory flow produced by a rotor-stator mechanism placed downstream of the test section of the wind tunnel.

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