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Scaling of Partial Cavity Drag Reduction[1] STEVEN CECCIO, SIMO MAKIHARJU, SARAH SCHINASI, MARC PERLIN, University of Michigan — Experiments to examine ventilated partial cavities configured for drag reduction were conducted at the U.S. Navy's W. B. Morgan Large Cavitation Channel (LCC) and at the University of Michigan's 1:14th scale model of the LCC. Experiments were focused on the gas flux required to form and maintain stable partial cavities. The models and free surface forming gates were geometrically similar, and the experiments were performed over the same range of Froude numbers. The Reynolds numbers based on downstream distance were up to 80 million for the large and 1.8 million for the small-scale experiments. And, during the small-scale experiments the Weber number was varied by a factor of two to assess the effect of surface tension on the required air flux. The measured air fluxes normalized by flow speed, model span and step height varied by one to two orders of magnitude with the change of Reynolds number, and this is primarily due to the different gas entrainment process at the cavity closure. Variation of the Weber number at the small scale modestly changed the required gas fluxes.

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