TRANSFLOW: An experimental facility for vacuum gas flows

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Abstract
The TRANSFLOW experimental facility represents a reliable tool for measuring the conductance of 1:1 scale components as typically used in vacuum systems in a wide range of the Knudsen number (e.g. $10^{-4} \leq Kn \leq 10^{3}$). The main principle of this facility is the dynamic measurement of the pressure difference upstream and downstream of the duct by setting a constant mass flow rate through the test channel. Many experiments on fully developed and developing flows, based on long and short channels respectively, have been already completed and comparisons with corresponding numerical results have been successfully performed. It has been clearly proven that the TRANSFLOW experimental setup provides conductance results with overall uncertainty between 1 to 10% and it could be used as a benchmark facility for any new proposed scientific numerical method in rarefied gas dynamics and in the whole range of gas rarefaction.