Abstract

This paper describes the update and characterization of a previously pure aerodynamics wind-tunnel into a facility able to simultaneously execute aerodynamics and aeroacoustics testing. It is demonstrated that the application of high-performance acoustic materials on strategic positions of the wind-tunnel circuit and punctual actions can substantially reduce the background-noise level. This paper shows efficient measures which resulted in broadband-noise reduction of up to 5 dB and practically complete removal of spectral tones. In addition, it is demonstrated that the applied acoustic treatment reduced the turbulence level, measured at the test-section at maximum operational velocity, from the previous 0.25% level to 0.21%. As a minor penalty, the acoustic treatment reduced the flow velocity in 2% for the same electric-power input. Finally, the work described in this paper resulted on a wind-tunnel with good flow quality and capacity for aeroacoustics testing.

Keywords