Pressure reciprocity calibrations of laboratory standard microphones at the National Institute of Standards and Technology

Randall P. Wagner, Engineering Physics Division, Physical Measurement Laboratory, National Institute of Standards and Technology, 100 Bureau Drive, Gaithersburg, Maryland 20899, United States, randall.wagner@nist.gov

The reciprocity technique has long served as a method for pressure calibration of microphones. It is a primary method, which determines microphone sensitivities from first principles and does not require a previously calibrated acoustic transfer standard. For calibrations of laboratory standard microphones, this method is standardized and utilized at national measurement institutes worldwide. Standard microphones calibrated by reciprocity are in turn used to calibrate additional microphones and sound calibrators, which apply known sound pressures to calibrate acoustical measuring devices and systems. Reciprocity calibrations done at the National Institute of Standards and Technology (NIST), which is the national measurement institute for the U.S., provide its customers with accurate results traceable to the International System of Units (SI). These customers and organizations that utilize their services perform large numbers of secondary and further calibrations and measurements concerned with hearing conservation and testing, aircraft noise, noise regulation enforcement, acoustical test and measurement equipment, and auditory research. An overview of the reciprocity technique is presented along with a few examples of how customers of the NIST acoustical calibration services make use of their calibrated devices and calibration data.