Calibration of A MEMS Anemometer

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Accurate calibration of an anemometer would often be required in a wind tunnel which can provide the reproducible metrology environment for the desired air velocity. However, such a calibration procedure is expensive and not suitable for mass production as the demands of the HVAC or building automation related IOT shall have to deploy a very large number of the anemometers. In this paper, we discuss the comparison of the calibration for MEMS anemometers in a commercial wind tunnel and a specially designed closed conduit with a diameter of one inch. It is found that the MEMS anemometer packaged into a plate at the probe that is parallel to the air flow direction with a well-defined boundary layer can be accurately calibrated to a full dynamic range over 100:1 in the designed closed conduit with only a constant deviation to the values obtained in a commercial wind tunnel. This allows mass production of the anemometers at a very low cost which enables the current application demands. This paper will discuss the design principle, the test data, and the theoretical understandings.