

# Development of Improved Measurement System for Characterization of Climatic Chambers

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## Abstract

Climatic chambers have proven to be an important tool for testing of various products and materials under specific environmental conditions in different industries as well as in testing and calibration laboratories. Temperature and humidity uniformity are one of the deciding parameters for evaluation of chamber's performance. Traceable and reliable measurement of those parameters is crucial for correct assessment of chamber's eligibility for specific use. This paper presents an automated measurement system for determination of climatic chambers characteristics with low measurement uncertainty. The presented system has been developed at the Laboratory for Process Measurement and is directly traceable to the Croatian national standard for temperature and humidity. Temperature uniformity evaluation is achieved with ten platinum resistance temperature sensors connected via multiplexer to a precision thermometry bridge. Dew-point temperature is measured with chilled-mirror hygrometer. Control of the system and measurement data acquisition is enabled through a laboratory developed LabView software. The developed system is fully characterized in the temperature range from  $-40\text{ }^{\circ}\text{C}$  to  $170\text{ }^{\circ}\text{C}$  and the results are compared to an existing system comprised of thermocouple temperature sensors.