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The Study of Influence of Ambient Humidity on Vacuum Capacitance Diaphragm Gauges

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The capacitance diaphragm gauges play important role as the precise secondary vacuum standard in the range from atmospheric pressure down to the absolute pressure at mPa level.

One of the important factor capable to influences pressure measurements due to its effect on pressure sensors and electronics is humidity level of the ambient air. The surrounding humidity forms the equilibrium water molecules layers on all surfaces and may affect the measured capacitance.

The study concerns of new design sensors and electronics that are hermetically sealed and backfilled with nitrogen, in order to prevent humidity influencing the sensor signals. The measurement was performed using the gauges designed by INFICON LI.

CMI has tested the performance of the new sensors and electronics at variable conditions using their FPG primary absolute pressure standard as the reference. The study was done for three triads of CDG gauges in ranges of 133 Pa, 1333 Pa and 13 332 Pa at different ambient air humidity levels. The procedure, uncertainty analysis, results and discussion are presented.

Primary author: Mr VICAR, Martin (Slovak Technical University)

Co-authors: Dr WÜEST, Martin; Dr TESAR, Jiri (Czech Metrology Institute); Dr KRAJICEK, Zdenek (Czech Metrology Institute)

Presenter: Mr VICAR, Martin (Slovak Technical University)

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