# MOISTURE DETERMINATION OF COTTON IN STATIC CONDITIONS VIA CAPACITIVE SENSING

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## Abstract

This project aims to develop a reliable means to measure cotton moisture content in real time via capacitive sensing during the pneumatic conveying process. In this phase of the project the capacitive sensor was calibrated and a method of converting the sensor's output (mA) to moisture content was developed. The reliability of the capacitive sensor was determined as well as the effect a varying cotton coverage of the sensing face would have on the measured current of a cotton sample. The Delmhorst C-2000 Cotton Moisture Meter was used as a benchmark for the readings of the AgriChem FP32-C capacitive moisture sensor during the calibration phase of this project. The AgriChem FP32-C sensor will be used in dynamic settings later in the project, and eventually could be used in the cotton ginning industry. Cotton of varying moisture levels was measured by the C-2000 and the FP32-C to determine the correlation between moisture content and current output of the FP32-C sensor. The tests were performed with the sensing face being fully covered, having two-thirds coverage, one-half coverage, and one-third coverage. The data showed that the amount of sensing face coverage is very statistically significant and will need to be controlled during dynamic testing. Furthermore, it was determined that the measured current to moisture content conversion should be broken up into 3 ranges. 4.5 - 8.5%, 7.2 - 9.4%, 8.3 - 10.6% moisture content (as measured by the C-2000). Where applicable, a combination of conversion equations can be used, further increasing the stability of the model.