

Design and Testing of an Experimental Ten-Cell High Temperature PEM Fuel Cell Stack

by

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A Thesis Submitted to the Graduate
Faculty of Rensselaer Polytechnic Institute
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
Major Subject: Mechanical Engineering

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Troy, New York
December, 2012

ABSTRACT

This thesis presents the design, fabrication and testing of an experimental 10-cell fuel cell stack. The stack which can be assembled with up to 10 cells and interstitial cooling plates will be used to explore the performance of thermally pressed and ultrasonically bonded membrane electrode assemblies fabricated in the CATS fuel cell lab at RPI. A test stand was previously constructed specifically for stack testing. The stack and test stand are instrumented to take voltage and temperature readings at each plate as well as control temperature through end plate heating and interstack cooling plates. The stack was designed with the same flow field geometry as the single cell test fixtures used in previous experimentation in order to compare results from stacks to previous testing performed on single cell test fixtures in the CATS lab. Once constructed the stack was tested in increasingly larger stacks to gain experience with stack testing and culminated with full 10-cell stacks comprised of all thermally pressed, all ultrasonically bonded and a mixture of both thermally pressed and ultrasonically bonded MEAs.