

EU Harmonised Test Protocols for Automotive Applications

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The European Union's transport sector is the second largest energy consumer in Europe being responsible for 33% of the total energy consumption and about 25% of the total European greenhouse gas emissions (GHG) emissions. The European Union is committed to transforming its transport and energy sector as part of a future low carbon economy. It is recognised that Fuel Cell and hydrogen technologies hold great promise for energy and transport applications from the perspective of meeting Europe's energy, environmental and economic goals and are part of the Strategic Energy Technologies (SET) Plan - , which was adopted by the European Union in 2008.

Proton Exchange Fuel Cells due to their high energy density, low operating temperature and high efficiency are considered to be very suitable for vehicle propulsion. In such applications, fuel cells could encounter operating conditions which are severe to the materials involved.

The objective of this paper is to present a set of harmonised operating conditions, testing protocols and procedures for assessing both performance and durability of Polymer Electrolyte or Proton Exchange Membrane Fuel Cells (PEMFCs) in Single Cell configuration for automotive applications to allow fair comparison of test results from various projects and laboratories.

The paper presents a set of reference operating conditions such as temperature, pressure, humidification, gas flow and composition at the fuel and oxidant inlet representative for future automotive applications. A methodology is established to examining the relative influence that the individual operating parameters exert on the MEA performance in single cell configuration.

Fuel cell durability is evaluated through endurance testing by applying a repetitive load profile to the cell and measuring performance degradation in terms of cell voltage decrease as function of operating hours. To assess the cell degradation rate a dynamic load cycle for endurance testing is proposed. The Fuel Cell Dynamic Load Cycle, (FC-DLC) is used in this document and is derived from the New European Driving Cycle (NEDC) modified for fuel cell applications.

REFERENCES

1. G Tsotridis et.al "EU Harmonised Test Protocols for PEMFC MEA Testing in Single Cell Configuration for Automotive Applications ISBN 978-92-79-54133-9