



VOLUme Manufacturing of PEMFC Stacks for **TR**ansportation and In-Line **Q**uality Assurance

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VOLUMETRIQ, funded under the topic "Cell and stack components, stack and system manufacturing technologies and quality assurance" of the 2014 annual working plan, has the ambitious objectives of simultaneously achieving the scale-up of a novel reinforced membrane, based on an electrospun polymer nanofibre reinforcement, first developed in MAESTRO, with at-scale downstream manufacture of catalyst-coated membranes, alongside the volume production of bipolar plates and the manufacture of automotive stacks reaching 2020 cost and power targets. It thus has every potential to provide a European automotive stack platform integrating European cell and stack components.

In the first 18 months (of the 42 month duration), reference membrane electrode assemblies have demonstrated a beginning of life current density of 2.0 A/cm² at 0.6 V in single cell testing, while first improved MEAs incorporating project reinforced membranes have given 1.29 W/cm², which represents an encouraging improvement in power

Ionomer and Membrane Development and Scale-Up

ionomers (Solvay) Aquivion with high low g/eq and performance were developed, 8 electrospun fibres PBI micron (CNRS) membrane used as reinforcement:







Electrospun web reinforced membrane structure is different from those reinforced with ePTFE and imparts enhanced mechanical properties:

CCM/MEA Development and Volume Manufacture





Performance of PBI electrospun supported membrane (JMFC) using Aquivion ionomer demonstrates superior performance to the



Bipolar Plate Manufacture

Bipolar Plate







Scaled-up electrospun PBI nanofibre reinforcement for membrane fabrication

project reference

CCM scale-up to roll to roll process is on-going with ElringKlinger

Parametric Sensitivity and Stack Manufacture

EK's 200 cell NM5 stack module - 46 kWel (voltage loss of < 10 μ V/h over > 8000 h)

Building of fuel cell stack assembly line for high volume manufacturing





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