
TECHNOLOGICAL ANALYSIS FOR MACHINING OF THE REFORMERS FOR FUEL CELLS TESTING

Goran Mladenovic¹, Sasa Zivanovic¹, Milos Milosevic², Aleksandar Sedmak¹, Andrej Plohar³, Ivana Ivanovic², Mirko Rakin⁴

¹University of Belgrade, Faculty of Mechanical Engineering, 11120 Belgrade, Serbia

²University of Belgrade, Innovation Centre of Faculty of Mechanical Engineering, 11120 Belgrade, Serbia

³Department of Catalysis and Chemical Reaction Engineering, National Institute of Chemistry, Ljubljana, Slovenia

⁴University of Belgrade, Faculty of Technology and Metalurgy, Karnegijeva 4, 11000 Belgrade, Serbia

*Corresponding author e-mail: gmladenovic@mas.bg.ac.rs

Abstract

Reformer is an integral component of the polymeric electrolyte membrane (PEM) fuel cell and it is used for experimental combustion testing. By analyzing the geometry of the experimental reformer, it consists of three plates, two pins for leading and a single screw for sealing. In terms of technological analysis for manufacturing of the experimental reformer emphasis was thrown on the intermediate plate which is necessary to carry out Wire EDM machining. Before the machining based on CAD models it was performed tool part generation in order to perform machining simulation. In order to minimize manufacturing costs by techno-economic analysis it was varying the wire thickness, and therefore cutting parameters. Besides the variation of the cutting parameters it was varied and the intermediate plate thickness. It was made a three sets of experimental reformer, wherein the electrical discharge machining (EDM) was performed on two machines (Mitsubishi FA-10S Wire EDM and "Ewis" EV.00.000M4) with two different wire thickness. After machining is was carried out the welding procedure, and after that re-machining in order of remove the excess material which is applied by welding process.

Keywords

Reformer, CAD/CAM systems, Wire EDM machining

Acknowledgement

This study was supported by Research grant TR35040 and TR35022 from the Ministry of Education, Science and Technological Development, Republic of Serbia and was carried out under the Science for Peace and Security Project No. EAP.SFPP 984738.