

SENSITIVITY ANALYSIS OF THE DIMENSIONS AND OPERATING CONDITIONS OF A NEW CONCEPT ROTARY ENGINE

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ABSTRACT –

2D and 3D simulations of a new concept rotary engine concluded that it produces higher power to weight ratio (up to 5 times) than Otto engines and has a higher thermal efficiency (up to 20%). It is crucial to test this engine in a wide speed range (1,000-15,000 rpm) and identify the parameters that influence its efficiency and output power the most. This paper conducts an 1D sensitivity analysis with AVL Boost in combination with 3D CFD simulations for validation (ANSYS Fluent). Energy values such as pressure, combustion, torque, output power were evaluated as function of the geometrical characteristics of the engine. The main conclusions are that the engine was choked over the 8,000 rpm and the most efficient speed was 4,500-5,000 rpm. In general, the most important parameters that limited its operation in high speed are the flow rate of valves and the pressure chamber's geometry.