ECOLOGICAL AND ENERGY ENGINE CHARACTERISTICS WHEN THE ENGINE APPLIES DIFFERENT WORKING PROCESSES

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Summary: *Multi-process working principle is one of the modern approaches to development of internal combustion engines. By the combination of the original features of the OTO and diesel working processes can be achieved improving ecological and energy characteristics of the engine. Examples for that are spark ignition engine with stratified charge and compression ignition engines with homogeneous charge (HCCI). For the implementation of basic research in this field was implemented experimental Multi-process engine and was developed its testing methodology. This paper presents the results of the combination of OTO / DIESEL working processes when the engine working with both conventional and bio-fuels.*
Keywords: *compression ratio, efficiency, emission, experimental engine, working process*

1. INTRODUCTION

It is known that the way the engine working process is running has a dominant influence on the engine efficiency and emission. The formation of flammable mixture, its homogeneity and composition, its way of ignition and the course of combustion process, as well as load control mode are the main characteristics of the working process (Table 1). Classical concepts of OTTO and Diesel engines are conditioned by the properties of the used fuel and they have generic advantages and disadvantages. Modern technologies of engine equipment have allowed synthesis of the good features of traditional working processes.

Thus, spark ignition of very lean inhomogeneous mixture, reduction of pump losses at low loads and increase of the compression ratio is enabled in gasoline direct injection engine (GDI) with stratified charge, thanks to the internal formation of mixture. In this way, engine efficiency at low and moderate loads is much-improved [5]. At medium and high-loads, working process is conducted by OTTO cycle. However, DIESEL attributes of the working process have brought their shortcomings: the sensitivity of the process of mixture forming to the change of the flow in the chamber (misfiring) and particulate emission.

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