

Low and Medium Calorific Value Gasification Gas Combustion in IC Engines

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ABSTRACT

Higher hydrogen to carbon ratio of gasification gases produced from solid fuels has been utilized in internal combustion engines (ICE) since long ago. Advancements in the conversion technologies and the abundant availability of solid fuels added with advancements in the technology of gas engines and their fuelling system have renewed the interest and are believed to be transition fuels from carbon based to hydrogen based. Over the past 30 years, there were many trials to bring back the gasification gas technology in ICE. This study is mainly focused on the investigation of technical challenges with lower and medium calorific value gasification gases in IC engines. The range of operation of these fuels is found to be influenced by available injection duration and injector pulse width in direct-injection spark-ignition engines. The lower calorific value of these gases also make them less competitive to CNG and H₂ in the dual fueling in CI engine even though they have better advantage in the emissions. Furthermore, red glow color deposit was spotted on the surface of the combustion chamber after short running on all fuels that was resulted from decomposition of iron pentacarbonyl (Fe(CO)₅) contaminants.

Keywords: gasification gas, fuel, combustion, IC engine, SI, CI, technical challenges

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