A Study on Adaptability of Alternative Fuels for Lean Burn Two-Stroke ATAC Engine

ATAC is â€œbulk-likeâ€ and/or â€œnon-propagatingâ€ combustion caused by compression autoignition of premixture, and it is stable even in the lean region. And ATAC engine is expected to be an engine using alternative fuels which are difficult to apply to usual engines because of their low cetane number. In this study, a two-stroke ATAC engine test was carried out to evaluate an adaptability of alternative fuels for lean burn. Methanol, ethanol, DME, methane and propane were used as the test fuels, and the influence of fuel characteristics on autoignition timing, combustion duration and autoignition temperature were investigated in the lean region. Using oxygenated fuels, the lean limit of ATAC operation region shifts to lean side. ATAC autoignition temperature is not depend on equivalence ratio, delivery ratio and engine speed, and it is only decided by the kind of fuel. The order of the ATAC autoignition temperature is methanol, ethanol, DME, gasoline from lower side.

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